

CLASS 34, DRYING AND GAS OR VAPOR CONTACT WITH SOLIDS

SECTION I - CLASS DEFINITION

This is the generic class for (1) the separation of liquids from solids, i.e., drying; (2) the contacting of solids with either, or both, gases or vapors; and (3) feather treatment.

It has both process and apparatus not elsewhere provided for but no products thereof. When a product is claimed it is classified in the class appropriate thereto and cross-referenced here for the process or apparatus.

In the definitions of this class, "material" means that which is undergoing treatment, which may be of any kind or form and includes the living body.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

NOTES TO LINES WITH OTHER CLASSES

The lines between Class 34 and other classes are in the notes below and also in References To Other Classes, below.

(0.5) NOTE TO THIS SECTION

- (0.5) Note. Class 134, Cleaning and Liquid Contact With Solids, is the generic class for contacting solid material with liquids, and see the line with Class 34 in Lines With Other Classes in the class definition of Class 134.

(1) NOTE TO THIS SECTION

- (1) Note. Material heating and heat generating classes that have lines with Class 34 are referenced to this (1) Note in the search notes in References to Other Classes, below.

(2) NOTE TO THIS SECTION

- (2) Note. The following classes are superior to this class (34) and takes the subject matter there provided for, even though involving drying and/or gas or vapor contact with solids:
Class 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers.

Class 12, Boot and Shoe Making, has the following line: Processes and apparatus for drying only are in Class 34. Where in addition to the drying there are steps of or means for shoe manufacture, the patents are in Class 12. Class 12 also includes (see particularly subclasses 1, 41.1, 41.3, and 41.5) processes and apparatus for treating shoes or shoe parts by steam or other vapors, moisture or moist air to temper or soften the shoes.

Class 19, Textiles: Fiber Preparation.

Class 26, Textiles: Cloth Finishing. Subclasses 71+ take cloth drying or heating with means for expanding (e.g., stretching, spreading) a running length web of the cloth; or steps for applying a stretching or spreading force to the fabric in addition to that incidental to mere feed of the fabric through the machine.

Class 28, Textiles: Manufacturing, subclasses 217+ for thread finishing combined with drying.

Class 38, Textiles: Ironing or Smoothing, has processes and apparatus for producing a smooth appearance on the surface of a textile article or fabric, most of which necessarily produce a concurrent drying action and some of which have gas or vapor contact means, particularly subclasses 3, 14+ and 77.1+.

Class 43, Fishing, Trapping, and Vermin Destroying. See particularly subclasses 124+ for destruction of vermin by gases and vapors.

Class 44, Fuel and Related Composition.

Class 47, Plant Husbandry.

Class 48, Gas: Heating and Illuminating.

Class 57, Textiles: Spinning, Twisting, and Twining.

Class 65, Glass Manufacturing.

Class 66, Textiles: Knitting.

Class 68, Textiles: Fluid Treating Apparatus, particular attention being called to subclasses 5+ for textile gas or vapor treating apparatus; subclasses 19+ for drying combinations, and subclasses 241+ for wringers, per se.

Class 71, Chemistry: Fertilizers.

Class 72, Metal Deforming, subclasses 41+ for disclosure of work lubricating.

Class 75, Specialized Metallurgical Processes, Compositions for Use Therein,

Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures.

Class 87, Textiles: Braiding, Netting, and Lace Making.

Class 99, Foods and Beverages: Apparatus, (1) takes apparatus for treating food materials, in which, in addition to drying and/or gas or vapor contact there are additional means for performing additional treating operations on food (for example, adding ingredients, comminuting, forming, etc.); (2) takes apparatus for treating foods by gas or vapor contact for moistening. See Class 99, subclasses 468+ for apparatus of that class type providing an enclosed modified atmosphere, and subclasses 516+ for the application of treating fluid.

Class 101, Printing. Note particularly subclasses 416.1+ and the notes thereto.

Class 106, Compositions: Coating or Plastic.

Class 109, Safes, Bank Protection, or a Related Device, subclasses 20 and 29+.

Class 127, Sugar, Starch, and Carbohydrates.

Class 132, Toilet.

Class 139, Textiles: Weaving.

Class 140, Wireworking.

Class 144, Woodworking, see particularly subclasses 50+, 254 and 271.

Class 148, Metal Treatment.

Class 149, Explosive and Thermic Compositions or Charges.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture.

159, Concentrating Evaporators, for drying apparatus or processes which start with a liquid suspension or solution of solids and concentrate the same, even though carried to the point of complete dryness of the solids.

162, Paper Making and Fiber Liberation, for combination of drying or gas or vapor contact with solids combined with a paper making or fiber liberation step there provided for; see especially subclasses 290, 359 and 375+ for such combinations including heating or heat exchange means.

169, Fire Extinguishers, for such apparatus and processes, per se, Class 34 having combinations involving such subject matter; see particularly subclasses 43+, 83 and 90.

196, Mineral Oils: Apparatus, for apparatus for the treatment of mineral oils.

201, Distillation: Processes, Thermolytic. See Lines With Other Classes of the class definition of Class 201 for the line.

202, Distillation: Apparatus, and see Lines With Other Classes to the class definition of Class 202 for the line.

203, Distillation: Processes, Separatory. See Lines With Other Classes of the class definition of Class 203 for the line.

204, Chemistry: Electrical and Wave Energy.

208, Mineral Oils: Processes and Products, for processes of treating and preparing mineral oils including their separation from sands, coal or shales.

245, Wire Fabrics and Structure.

252, Compositions, particularly subclasses 60 and 61, for physical separation agents.

260, Chemistry of Carbon Compounds. It is noted that the removal of water of crystallization is considered a chemical manufacturing operation for Class 260.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, the line between Classes 34 and 264 in regard to processes for spinning (by extrusion) and drying the extruded filament in a significant manner, is that Class 34 takes such inventions when the extrusion step is not significantly claimed. Class 264 takes methods, per se, for treating a plastic body with a vapor to smooth or polish the surface, subclass 341.

266, Metallurgical Apparatus, subclasses 251+ for means treating solid metal objects by contacting the object with a gas to bring about a metallurgical change in the object, e.g., gas quenching.

270, Sheet-Material Associating.

291, Track Sanders, particularly subclasses 3+, 18, and 19+.

396, Photography, subclass 579 for the use of a gaseous fluid treating apparatus in photography.

399, Electrophotography, subclass 338 for fixing an image to a copy medium by heat contact.

404, Road Structure, Process, or Apparatus, subclasses 83+.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, has the following line with Class 34: Processes and Apparatus for preserving, disinfecting, or sterilizing by drying only, or drying combined with special ray

treatment only, are in Class 34. Where in addition to the drying and/or special ray treatment steps or apparatus, there are additional steps or apparatus to perform disinfecting, deodorizing, preserving, or sterilizing, the patent is placed in Class 422, or placed in classes which provided for the additional combined operations, e.g., Class 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, or Class 427, Coating Processes, etc.

423, Chemistry of Inorganic Compounds, it is noted that the removal of water of crystallization is considered a chemical reaction for Class 423.

424, Drug, Bio-Affecting and Body Treating Compositions.

425, Plastic Article or Earthenware Shaping or Treating: Apparatus, appropriate subclass for shaping or reshaping apparatus for plastic material combined with drying means, especially subclasses 72.1+ for a shaping orifice and downstream gaseous treating means and subclasses 73+ for such apparatus combined with a ventilating hood or chamber.

426, Food or Edible Material: Processes, Compositions, and Products, (1) takes all.

430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof.

435, Chemistry: Molecular Biology and Microbiology, subclasses 283.1+, particularly subclass 284.1, for apparatus for preserving differentiated tissue or organs; subclass 307.1 for apparatus for preserving micro-organisms and subclass 308.1 for apparatus for separating micro-organisms from culture media.

460, Crop Threshing or Separating.

493, Manufacturing Container or Tube From Paper; or Other Manufacturing From a Sheet or Web.

502, Catalyst, Solid Sorbent, or Support, Therefor: Product or Process of Making, subclasses 20+ for a process of regenerating or reactivating a catalyst or sorbent, other than mere drying.

504, Plant Protecting and Regulating Compositions.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for

or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

585, Chemistry of Hydrocarbon Compounds, subclass 15 for synthesis of a hydrocarbon hydrate with subsequent removal of water therefrom.

588, Hazardous or Toxic Waste Destruction or Containment, this is the generic class for permanently containing any form of hazardous or toxic waste, or for chemically destroying non-gaseous hazardous or toxic waste (i.e., too hazardous or toxic to be placed in an ordinary municipal landfill).

607, Surgery: Light, Thermal, and Electrical Application, see particularly subclasses 1+.

(3) NOTE TO THIS SECTION

- (3) Note. The classes with special types of Class 34 subject matter or combinations involving such subject matter not treated above are referenced to this (3) Note in the search notes in References to Other Classes, below.

(4) NOTE TO THIS SECTION

- (4) Note. The classes that take the subcombinations of Class 34 subject matter there provided for are referenced to this (4) Note in the search notes in References to Other Classes, below.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 4, Baths, Closets, Sinks, and Spittoons, has such subject matter having as a part thereof means to dry and/or contact with gases or vapors particularly subclasses 111.1+ for dry closets with driers or burners, subclasses 524+ for vapor or hot air baths, and subclasses 209+ for ventilating means. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).

- 5, Beds, appropriate subclasses particularly subclasses 421, 690, or 724+ for mattress ventilation, inspection or heating. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 15, Brushing, Scrubbing, and General Cleaning, has the characters of apparatus there provided for, even though the sole disclosed function is for drying. Relative to the air blast and suction apparatus, those which remove liquids by an air blast or suction cleaner action are in Class 15 and those which remove liquids by evaporative action are in Class 34. Apparatus for drying and/or gas or vapor contact with solids involving the types of operations for Class 15 in combination with other types for Class 34 are placed in Class 34. Apparatus involving Class 15 type structures (excepting the situation outlined in the first and third sentences of this paragraph) combined with Class 34 type structures are placed in Class 15. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 30, Cutlery, subclasses 34.05 and 123 and their indented subclass, particularly subclasses 41, 128+ and 140, has cutlery combined with driers and/or gas or vapor contact means built as part of the structure thereof. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 36, Boot, Shoes, and Leggings, subclasses 2.6 and 3, has heated and ventilated boots and shoes. (special types of Class 34 subject matter or combinations).
- 51, Abrasive Tool Making Process, Material, or Composition, for an abrasive tool making process involving drying and/or gas or vapor contact with solids. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 52, Static Structures (e.g., Buildings), (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 62, Refrigeration, has apparatus and processes for separating liquids from other materials by refrigerating operations, Class 34 having the same combined with other apparatus or processes for drying and/or gas or vapor contact with solids. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 95, Gas Separation: Processes, appropriate subclasses (a) for the separation of a gas from a fluid mixture in combination with the regeneration of the separating media by drying or by gas or vapor contact and (b) the subcombination of the separation of a gas from a fluid mixture. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 96, Gas Separation: Apparatus, appropriate subclasses (a) for apparatus for the separation of a gas from a fluid mixture in combination with means to regenerate the separating media by drying or by gas or vapor contact and (b) the subcombination of apparatus for the separation of a gas from a fluid mixture. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 99, Foods and Beverages: Apparatus, Line with Class 34. Class 99 takes all cooking apparatus. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 100, Presses, appropriate subclasses for presses not elsewhere provided for, and particularly subclasses 92+ for presses combined with means to heat the material. Class 100 has expressing of liquids from material, per se, (particularly in subclasses 104+) and expressing combined with heating of the materials undergoing expressing. Expressing combined with drying of the solids other than by heating necessary for expressing is in Class 34. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 105, Railway Rolling Stock, particularly subclasses 160.5 and 451. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 110, Furnaces, has solid fuel furnaces with means for drying the fuel burned and/or with means to contact the fuel with gases or vapors as an incident to burning, and corresponding processes. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 118, Coating Apparatus, subclasses 58+ for coating apparatus combined with means to heat, dry, cool or contact the work with a noncoating gas or vapor, and subclasses 715+ for apparatus for coating work with a gas or vapor other than steam. Coating or impregnating with steam is in Class 34. Apparatus for treating a coating with a solvent vapor, per se, to smooth, polish or coalesce the coating is in Class 34. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).

- 122, Liquid Heaters and Vaporizers, having means to dry the solid fuel burned and/or with means to contact the fuel with gases or vapors as an incident to burning, and corresponding processes. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 126, Stoves and Furnaces, has: (1) Solid Fuel burning subcombinations having means to dry the solid fuel burned and/or with means to contact the fuel with gases or vapors as an incident to burning and corresponding processes. (2) Combination of fuel (solid or fluid) burners with means to apply heat or general utility, having no means specialized for drying, and corresponding processes. If a patent has any claim restricted to a drying process, the patent is placed in Class 34 and cross-referenced to Class 126 for the heating apparatus. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 131, Tobacco, line with Class 34: (1) Processes of drying and/or treating tobacco with gases and/or vapors both, per se, and combined with other treatments are in Class 131. (2) Tobacco drying apparatus combined with means to perform other operations is in Class 131. (3) Tobacco drying apparatus, per se, is in Class 34. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 135, Tent, Canopy, Umbrella, or Cane, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above)
- 138, Pipes and Tubular Conduits, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 141, Fluent Material Handling, With Receiver or Receiver Coacting Means, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 164, Metal Founding, appropriate subclasses for processes and apparatus for mold forming and drying. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 165, Heat Exchange, the line with Class 34 is: (1) Class 34 takes all patents having any claim restricted to a process of drying. (2) Class 34 takes all patents having any claim restricted to a process which involves contacting a solid undergoing treatment with a gas or vapor. (3) Class 165 takes all heat exchange processes not limited as in (1) or (2) above. (4) Class 34 takes apparatus for exchanging heat between fluent materials combined with added means for drying and/or contacting solids undergoing treatment with gases or vapors. (5) Class 165 has apparatus exchanging heat between fluent materials not having the added features set forth in (4) above, even though discharge of gases or vapors to an enclosure is claimed, where there is no means to promote contact with solids and/or to handle solids therein. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 174, Electricity: Conductors and Insulators, has drying means constituting a part of the structure, particularly subclasses 8+. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 192, Clutches and Power-Stop Control, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 193, Conveyors, Chutes, Skids, Guides, and Ways, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 198, Conveyors: Power-Driven, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 201, Distillation: Processes, Thermolytic, see Lines With Other Classes of the class definition of Class 201 for the line. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 202, Distillation: Apparatus, see Lines With Other Classes of the class definition of Class 202 for the line. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 203, Distillation: Processes, Separatory, see Lines With Other Classes of the class definition of Class 203 for the line. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 209, Classifying, Separating, and Assorting Solids, has the combination with drying, particularly subclasses 2, 3, 10, and 11, except where the sole separation is of a portion of the material for recirculation for further drying, which is in Class 34, particularly subclasses 10, 11, 57, and 102, and those patents in which the treating gas or vapor may incidentally carry away some solids where no classifying, separating or assorting is intended, even though such solids may be separated from the gas or vapor, are in subclasses 26+, 32, and 79+. Class 209 has all

- processes and apparatus for contacting solids with gases or vapors for the purposes of such class see subclasses 132+. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 210, Liquid Purification or Separation, has (1) apparatus for separating or treating liquids mixed with solids, which mixture is in a flowable condition, see particularly subclasses 175+ for separators combined with means to heat the separator. Class 34 takes such separators and corresponding processes when combined with additional and independent driers or means to contact the separated solids with gas. (2) Class 210 also takes centrifugal extractors having a perforate wall surrounding the material or article to be separated from a liquid and Class 34, in subclasses 8 and 58+, takes centrifugal separators having means to support an article but not provided with a perforate wall (and corresponding processes where no filtration is defined).
- 211, Supports: Racks, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 219, Electric Heating, subclasses 600+ for inductive heating, subclasses 678+ for microwave heating, subclasses 764+ for capacitive dielectric heating, and subclass 50, has metal heating even though involving gas or vapor contact with the metal heated. Note especially subclasses 72+ subclasses 200+ has electric heating means combined with means to apply heat of general utility, having no means specialized for drying, and corresponding processes; see particularly subclass 280 for liquid and gas heaters, subclasses 391+ for ovens. If a patent has claim restricted to a drying process, it is placed in Class 34 and cross-referenced to Class 219 for the heating apparatus, except that if the claimed process is in fact no more than electric heating of the work the patent is classified in Class 219. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 221, Article Dispensing, appropriate subclasses for article dispensers not otherwise provided for. Class 221 takes subcombinations of Class 34 subject matter as relate to article dispensing (feeding) devices, per se. See the class definition of Class 221 for the disposition of other related art. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 222, Dispensing, and see the reference to Class 34, under section 24 of the main class definition for the line. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 223, Apparel Apparatus, and see Note (6) to the main class definition thereof for the line with Class 34. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 226, Advancing Material of Indeterminate Length, appropriate subclasses for methods of, and apparatus for, feeding material without utilizing the leading or trailing ends to effect movement of the material. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 236, Automatic Temperature and Humidity Regulation, has such means and corresponding processes not involving specific characteristics of the apparatus or process steps for this class (34). (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 237, Heating Systems, the line with Class 34 is: (1) Class 34 takes all processes limited to drying. (2) Class 237 takes processes of heating enclosures, not limited to drying. (3) Class 34 takes the combination of a heating system not claiming combustion heating means in combination with means to apply the heat and/or the heated gases or vapors to solids or such means in combination with material handling or supporting means. For such combinations with combustion heating means, see Class 432, Heating. (4) Class 237 takes the heating system subcombination and in combination with an enclosure to be heated. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 241, Solid Material Comminution or Disintegration, appropriate subclasses, for solid material comminution combined with either drying or gas and vapor contact. Where the material handling means has no special features of construction to cause comminution (as feeding means, agitating means, etc.), the patent is in Class 34, even though incidental breaking up of the material may occur. See section 6 of the main class definition of Class 241. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).

- 242, Winding, Tensioning, or Guiding, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 248, Supports, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 261, Gas and Liquid Contact Apparatus, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 312, Supports: Cabinet Structure, has the structure of such devices, including those combined with static gas or vapor treating means in subclass 31, and see note (1) to the definition of subclasses 31+ for the line. Cabinet structures combined with ventilating means are in subclass 166 and with heater for purposes other than drying, are in subclass 167. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 312, Supports: Cabinet Structure, subclasses 31+ for cabinets with gas or vapor treatment of material, subclass 213 for cabinets with ventilated or foraminous walls, subclass 214 for cabinets with spaced or insulated walls, subclass 229 for cabinets with drains and subclass 236 for cabinets with heat exchange means. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 366, Agitating, the line with Class 34 is: Class 34 takes all patents having any claim restricted to a drying process. Class 366 takes agitating processes not limited to drying. Class 366 takes agitators, per se, including agitators in which the mixing is through the medium of a fluid fed for mixing and not drying purposes, agitators with means to dry materials prior to feeding to and/or subsequent to discharge from the agitator, agitators combined with means to heat the material during agitation for purposes other than drying, and agitators with means to incorporate a fluid (including a gas) in the final product. Class 34 has drying apparatus and apparatus for contacting solids with gases or vapors, even though agitating means is included, not classifiable in Class 366, under (3). (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 373, Industrial Electric Heating Furnaces, line with Class 34: (1) Class 34 takes all patents claiming a process of drying, even though electric furnace structure is also claimed. (2) Class 373 takes electric furnace processes of heating, not limited to drying. (3) Class 373 takes electric furnace structures. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 406, Conveyors: Fluid Current, for such conveyors and processes having no means or steps for drying and/or contacting solids with gases or vapors in addition to those required for fluid current conveying. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 414, Material or Article Handling, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 426, Food or Edible Material: Processes, Compositions, and Products, for processes. Line with Class 34. (1) Class 34 takes the drying, per se, of edible material. (2) Class 426, takes the cooking and roasting of foods, gas or vapor contact for moistening edible material and a food working step combined with a gas or vapor contact with a solid (edible material). (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 427, Coating Processes, subclasses 372.2+ for processes of drying a coating. Processes of coating portions of a substrate to shield the substrate against drying are provided for in this class, subclass 9. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).
- 431, Combustion, (class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 432, Heating, subclasses 1+ for a residual heating process, even though involving gas or vapor contact with solids, not limited to drying; subclasses 159+ for the combination of a specific combustion products generator and means providing for contact between work and the generated products; subclass 198 for apparatus heating work in an externally heated closed chamber while in contact with a protective or treating gas; and appropriate subclasses for a drier with specific combustion heating means claimed and for residual heating apparatus. (Material heating and heat generating class. See (1) Note of Lines With Other Classes).
- 451, Abrading, particularly subclass 56 for a process of making or treating an abrasive tool which may involve drying and/or gas or vapor contact with solids. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).

- 454, Ventilation, attention being called to ventilated storage chambers, subclasses 173+. (Class taking subcombinations of Class 34 matter. See (4) Note of Lines With Other Classes above).
- 494, Imperforate Bowl: Centrifugal Separators, appropriate subclasses for apparatus and process for breaking up a mixture of fluids or fluent substances into two or more components by centrifuging within a generally solid-walled, receptacle-like member. Included therein is the separation of a particulate solid from a liquid; however, such drying as may concurrently take place is secondary to the recovery of one or the other or both, of the components. Specifically provided for therein are certain aspects of the separating apparatus such as means for exchanging heat, means for furnishing an auxiliary fluid, and so forth. (Special types of Class 34 subject matter or combinations. See (3) Note of Lines With Other Classes).

SUBCLASSES

- 58 With apparatus using centrifugal force:**
This subclass is indented under the class definition. Apparatus including means for subjecting material undergoing treatment to centrifugal force.
- (1) Note. The art is placed here on the disclosed function of subjecting the material undergoing treatment to centrifugal force. Apparatus having rotary parts acting on the material but not disclosed for the purpose of subjecting the material to centrifugal force has been placed in appropriate subclasses below, particularly subclasses 126 through 142, 179+ and 184+.
 - (2) Note. See the Search Notes below--especially in the subclasses noted--for classes having means subjecting material to centrifugal force
 - (3) Note. See the Search Notes below for classes that involve use of centrifugal force

SEE OR SEARCH THIS CLASS, SUBCLASS:
312,

SEE OR SEARCH CLASS:

- 30, Cutlery, subclass 41. (Class having means subjecting material to centrifugal force).
- 68, Textiles: Fluid Treating Apparatus, subclasses 19+. (Class having means subjecting material to centrifugal force).
- 99, Foods and Beverages: Apparatus, subclasses 479, 503, 511+, and 519 for centrifugal food treating apparatus. (Class having means subjecting material to centrifugal force).
- 118, Coating Apparatus, subclasses 52+ for coating apparatus having means to centrifuge the work. (Class having means subjecting material to centrifugal force).
- 124, Mechanical Guns and Projectors, subclasses 4+. (Class involving use of centrifugal force).
- 127, Sugar, Starch, and Carbohydrates, subclasses 19 and 56. (Class having means subjecting material to centrifugal force).
- 159, Concentrating Evaporators, subclass 6. (Class having means subjecting material to centrifugal force).
- 162, Paper Making and Fiber Liberation, subclass 384. (Class having means subjecting material to centrifugal force).
- 165, Heat Exchange, subclasses 86+ for a heat exchanger with heated or cooled movable surface. (Class having means subjecting material to centrifugal force).
- 198, Conveyors: Power-Driven, subclass 642. (Class involving use of centrifugal force).
- 209, Classifying, Separating, and Assorting Solids, subclass 120. (Class involving use of centrifugal force).
- 209, Classifying, Separating, and Assorting Solids, subclasses 60, 148 and 199. (Class having means subjecting material to centrifugal force).
- 210, Liquid Purification or Separation, subclasses 781+, 787+, 210+, and 360.1+ for centrifugal extracting processes and apparatus there provided for, and see the reference to Class 210 in References to Other Classes in the

- class definition of this class (34).
(class having means subjecting material to centrifugal force).
- 223, Apparel Apparatus, subclasses 24+.
(Class having means subjecting material to centrifugal force).
- 239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 7, 650+, appropriate subclasses, 214+ and 380+ for scattering fluent material by centrifugal force. (Class having means subjecting material to centrifugal force).
- 239, Fluid Sprinkling, Spraying, and Diffusing, subclasses 214+. (Class involving use of centrifugal force).
- 241, Solid Material Comminution or Disintegration, subclasses 5 and 275. (Class having means subjecting material to centrifugal force).
- 260, Chemistry of Carbon Compounds, subclasses 107+, 704 and 705. (Class having means subjecting material to centrifugal force).
- 261, Gas and Liquid Contact Apparatus, subclasses 83+. (Class involving use of centrifugal force).
- 366, Agitating, subclasses 263+. (Class involving use of centrifugal force).
- 406, Conveyors: Fluid Current, subclass 71. (Class involving use of centrifugal force).
- 415, Rotary Kinetic Fluid Motors or Pumps, particularly subclasses 89, 93 and 203+. (Class involving use of centrifugal force).
- 435, Chemistry: Molecular Biology and Microbiology, subclass 313. (Class having means subjecting material to centrifugal force).
- 494, Imperforate Bowl: Centrifugal Separators, appropriate subclasses for apparatus of that class, and see the search note to Class 494 in References to Other Classes in the definition of this class (34). (Class having means subjecting material to centrifugal force).

59**Rotary scattering member:**

This subclass is indented under subclass 58. Apparatus including a rotary member such as a plate, disc or cup which throws the material against a receiver such as a conical hopper.

- (1) Note. In many of these apparatuses the material is thrown into a receiver from which it falls to another thrower and so on in succession. For other similar apparatus not using centrifugal force, see this class, subclass 165 and appropriate indented subclasses.

60**For diverse operations on treated material:**

This subclass is indented under the class definition. Apparatus claiming diverse means for performing two or more diverse treating operations on material undergoing treatment. At least one must be either (1) drying or (2) gas or vapor contact with solids. Treating operations are operations designed to change characteristics of the solid material. Means for feeding, discharging, conveying, agitating, testing or other ancillary operations on the material, which operations do not change the characteristics of the material, are not, of course, included in this group.

- (1) Note. This subclass has the combination of lamps to apply light energy within or outside of the visible spectrum. Complete the search in this class, subclasses 266+, and see the notes thereto.
- (2) Note. This subclass and the indented subclasses do not include plural apparatus of the same kind for performing plural drying and/or gas or vapor contact operations of the same type on the solids even though the units are referred to by different names as steaming and drying chambers. Such plural units, stage operations, plural chambers, etc., are with the subclasses appropriate to the type of apparatus. See Note (4) in subclass 209 of this class.
- (3) Note. This subclass and indented subclasses do not include single vacuum type apparatus. See the search notes below.
- (4) Note. For processes for performing diverse operations, see the search notes below.
- (5) Note. Apparatus providing for treatment of the gas or vapor applied to the solids

for treatment, or evolved from the solids, is in this class, subclasses 72+.

- (6) Note. See Note (2) to Lines With Other Classes in the class definition of this class for drying and/or gas or vapor contact apparatus for performing other operations provided for in other classes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

92, for single vacuum type apparatus.
418+, for processes for performing diverse operations.

61 With two or more nondrying means:

This subclass is indented under subclass 60. Apparatus including one or more means to remove liquids from solids and two or more means to perform operations on solids other than drying.

62 With treated material cooling means:

This subclass is indented under subclass 60. Apparatus claiming in addition to drying means, means for cooling the treated material.

- (1) Note. Where both the drying and cooling operations upon the material are by gas or vapor contact apparatus, the patents have not been placed in this subclass or the indented subclasses, but with the appropriate gas or vapor contact apparatus subclasses, even though one or more of the contacts with the solid material are claimed as cooling, when: (a) There are plural contact apparatus of the same kind with independent gas or vapor streams, even though some are and some are not heated; see, for example, subclasses 209+ and notes. (b) There is a single contact apparatus having plural similar means for causing contact of plural independent gas or vapor streams, even though some are and some are not heated; see, for example, subclass 223 and notes. (c) There is a single contact apparatus with means to selectively heat and prevent heating of the contact gas or vapor (as by-passing the heater), including the recirculating type apparatus; see, for example, subclass 219 and note.

- (2) Note. Single types of apparatus within the class definition disclosed solely for cooling are with the appropriate type of apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

391+ and 428+, and see the notes thereto.

SEE OR SEARCH CLASS:

165, Heat Exchange, subclasses 61+ for combined heating and cooling heat exchanger apparatus.
432, Heating, subclasses 77+ for residual heating apparatus combined with work cooling structure.

63 Internal rotary drum drier:

This subclass is indented under subclass 62. Apparatus including rotary drum driers of the internal type.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

108, and indented, subclasses for other devices of this type, including devices providing a cooling circuit for the treating gas or vapor, particularly subclass 131.

64 Gravity flow-type drier:

This subclass is indented under subclass 62. Apparatus in which a gravity material flow or "shaft type" drier has combined with it cooling means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

165, and indented, subclasses for other driers of this type.

65 With integral cooling chamber or section:

This subclass is indented under subclass 64. Apparatus in which the cooling means is either (1) a section integral with the drier, or (2) a similar "shaft type" gravity flow section.

- (1) Note. Devices which draw gases through one section to cool the material and then heat it and pass it through another section are here.

66 Cooler chamber integral with or similar to drier:

This subclass is indented under subclass 62. Apparatus in which the cooling means which is combined with any drier is a chamber integral with or similar to the drier.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

67, and see note thereto.

67 Atmospheric:

This subclass is indented under subclass 62. Apparatus in which the cooling is done by means of atmospheric air contacting the solids, regardless of the means employed, such as blowers, conveyors or receptacles.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

63 through 66, for type driers and coolers there provided for in which atmospheric air is used for contact cooling.

68 Diverse heater types and/or gas or vapor contact types only:

This subclass is indented under subclass 60. Apparatus in which the only means for treatment is by (1) diverse heating type apparatus, (2) diverse apparatus that treats by gas or vapor contact, or (3) combinations of heat type with gas or vapor type.

- (1) Note. There must be at least two diverse types of apparatus. A single type of apparatus having both heating means and gas or vapor contact is placed with the type of apparatus.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

62, and indented subclasses, for similar drier and cooler combinations.

418+,

69 Diverse types of liquid removers only:

This subclass is indented under subclass 60. Apparatus including two or more distinct means for removing liquids from solid materials undergoing treatment, but involving no other character of operation on such material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

397+,

70 With expressing or wringing:

Which at least one of the means causes liquid removal by applying mechanical pressure to the solid material treated.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

71, 95, and 111, for driers including means for removing liquids from solid absorbents and drier belts or felts, even though done by expressing or wringing.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, appropriate subclasses, particularly subclasses 119.1, 120.1 and 260 and indented subclasses.

68, Textiles: Fluid Treating Apparatus, subclasses 21, 22 and 235 and indented subclasses, particularly subclass 241 and indented subclasses.

100, Presses, appropriate subclasses, particularly subclasses 92+ for pressing combined with heating, cooling or drying. And see the reference to Class 100 in (3) Note to the class definition of this class (34) for a statement of the line between the classes.

71 With means to remove liquid from treated material by contact with solids:

This subclass is indented under subclass 69. Apparatus including means to remove liquids from the material undergoing treatment by contacting the same with solid material which removes the liquids by absorption, adsorption or adhesion.

- (1) Note. External drum type driers utilizing belts or felts have not been treated as solid material contact driers even when the belts or felts are claimed as absorbent or adsorbent; see subclasses 111, 116 and indented subclasses, and 123 for such type driers, per se.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

95 and 329+, and see the notes thereunder.

SEE OR SEARCH CLASS:

15, Brushing, Scrubbing, and General Cleaning, for brushing and wiping apparatus in general.

72 **With means to treat gas or vapor:**

This subclass is indented under the class definition. Apparatus coming including means to treat the gas or vapor which either contacts or is evolved from the solid material undergoing treatment.

- (1) Note. When heating of the gas or vapor that contacts the solid is the only treating means the patent is classified with appropriate type of apparatus.
- (2) Note. Means to mix treating gases or vapors of the same kind though differing in physical characteristics are placed with the appropriate type of apparatus. If the gases or vapors are recirculated with the addition to or replacement thereof the patents are placed in the various subclasses for recirculation of treating gases or vapors; see (1) Note to subclass 219.
- (3) Note. For means for cooling gases or vapors by refrigeration see search notes below.
- (4) Note. For other gas or vapor treatment, see the search notes below.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

280+, for feather treating. Many of these devices inject steam and also separate dust, etc., from the exhaust gases.
467+, for processes involving treatment of gas or vapor.
524, particularly subclasses 526+, 548, and 557, for automatic control combinations.

SEE OR SEARCH CLASS:

- 62, Refrigeration, appropriate subclasses, for means for cooling gases or vapors by refrigeration.
- 96, Gas Separation: Apparatus, appropriate subclasses for apparatus for the separation of a gas from a fluid mixture.
- 110, Furnaces, subclass 119 and indented subclasses; 126, Stoves and Furnaces, subclasses 113 and 280; and 266, Metallurgical Apparatus, subclass 144 and indented subclasses.
- 165, Heat Exchange, appropriate subclasses for means for cooling gases or vapors by heat exchange
- 260, Chemistry of Carbon Compounds, for other gas or vapor treatment.
- 261, Gas and Liquid Contact Apparatus, appropriate subclasses for gas and liquid contact devices, per se.
- 312, Supports: Cabinet Structure, subclasses 31.01+, for means for cooling gases or vapors by refrigeration.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, for other gas or vapor treatment.
- 423, Chemistry of Inorganic Compounds, for other gas or vapor treatment.
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 283.1+ for fermentation apparatus, including means to treat gases or vapors; particularly subclass 300.1 for apparatus for trapping output gas; and subclass 301.1 for apparatus for separating foam.
- 454, Ventilation, appropriate subclasses for gas and liquid contact devices in combination with ventilating systems.

73 **By vapor condensation:**

This subclass is indented under subclass 72. Apparatus having means to condense vapors.

- (1) Note. For condensers, per se, see Class 257, Heat Exchange, subclass 24 and indented subclasses.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

468+,

SEE OR SEARCH CLASS:

- 201, Distillation: Processes, Thermolytic, appropriate subclasses for a thermolytic distillation process including condensing vapors.
- 202, Distillation: Apparatus, particularly subclasses 185+ for the association of a still and a condenser.
- 203, Distillation: Processes, Separatory, appropriate subclasses for a process of vaporizing a liquid material and condensing the vapor.

74 With other gas or vapor treatment:

This subclass is indented under subclass 73. Apparatus including means other than the condensing means to treat the treating gases or vapors by the addition or subtraction of substances from the treating fluids.

75 Direct contact with cooling substance:

This subclass is indented under subclass 73. Apparatus in which the vapors directly contact the cooling substance such as cold water or ice.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 72, 74, 83, and 84, for other devices for contacting treating gases or vapors with liquids.

SEE OR SEARCH CLASS:

- 261, Gas and Liquid Contact Apparatus, subclasses 75+ for vapor condensers of the direct contact type; and subclass 140 for contact apparatus of general utility with a refrigeration producer.

76 With forced circulation:

This subclass is indented under subclass 73. Apparatus in which the vapor or gas and vapor mixture undergoing condensation is forced to circulate by some mechanical means.

77 Recirculation of treating gas or vapor:

This subclass is indented under subclass 76. Apparatus in which the treating gases or vapors are recirculated in whole or part over the condensing means and the material treated.

- (1) Note. For other subclasses involving recirculation of the treating gases or

vapors, see (1) Note to subclass 219 of this class.

78 Recirculation of treating gas or vapor:

This subclass is indented under subclass 73. Apparatus in which the treating gases or vapors are recirculated in whole or part due to the thermosiphonic action of the condensing and/or heating means.

- (1) Note. For other subclasses involving recirculation of the treating gases or vapors, see (1) Note to subclass 219 of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 220, for similar apparatus not including condensers.

79 Separation of substances from treating or exhaust gases or vapors:

This subclass is indented under subclass 72. Apparatus in which substances are separated from gases or vapors used to contact the material under going treatment, or from the evolved gases or vapors.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 576+, for fluid current conveyor type driers which are usually provided with means to separate the material from the treating, i.e., conveying gas or vapor.

80 By absorbent:

This subclass is indented under subclass 79. Apparatus in which the substances are removed by absorbing means.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 71 and 95, and see notes.

SEE OR SEARCH CLASS:

- 96, Gas Separation: Apparatus, subclasses 108+ for solid sorbent apparatus.
- 312, Supports: Cabinet Structure, subclasses 31+ and see the notes.

81 In or forming walls, ceiling, or floor:

This subclass is indented under subclass 80. Apparatus in which the absorbing means are in or form part of the treating chamber walls, floor or ceiling.

82 By filter:

This subclass is indented under subclass 79. Apparatus in which the substances are removed by a filter.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

80 and 81, for means for passing gases or vapors through absorbing means which may also act to filter, or such means combined with a filter.

SEE OR SEARCH CLASS:

55, Gas Separation, the subclasses beginning with subclass 474 for filter media for gas separation.

83 Jet devices:

This subclass is indented under subclass 72. Apparatus in which means are provided for injecting into the gas or vapor some treating material.

(1) Note. This subclass includes means for injecting steam or water for fire extinguishing purposes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

74 and 75.

SEE OR SEARCH CLASS:

261, Gas and Liquid Contact Apparatus, appropriate subclasses, particularly subclasses 76 through 78.1.

84 Gas or vapor circulators or flow promoters:

This subclass is indented under subclass 83. Apparatus in which the injecting devices act to circulate or promote flow of the treating gas or vapor.

(1) Note. Many of these devices cause gas or vapor recirculation. For other subclasses involving gas or vapor recirculation, see (1) Note to subclass 219 of this class.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

221, in which a fluid similar in kind to the treating fluid is injected.

85 With apparatus cleaner and/or escaping material collector:

This subclass is indented under the class definition. Apparatus having either, or both, (1) means to clean the apparatus or some portion thereof, (2) means to collect for removal from the apparatus (with or without a removing means) material escaping from the desired and intended treating path.

(1) Note. Devices for agitating, feeding and/or discharging the material treated are not included. For means to strip material from external drum type driers, and for apparatus provided with stirrers or scrapers see search notes below.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

69+, for apparatus within the class definition combined with draining devices.

71 and 95+, for means to separate solids used to dry material undergoing treatment from such material, with or without means to dry such solids and/or return such solids to the machine.

72, and indented subclasses, (particularly subclass 79 and indented subclasses, for means for removing material from the gases or vapors used to treat the solids or from the gases or vapors evolved due to treatment of the solids.

117 and 120, for means to strip material from external drum type driers.

173, 178, and 179+, for apparatus provided with stirrers or scrapers.

SEE OR SEARCH CLASS:

165, Heat Exchange, subclass 70 for a heat exchanger with a leakage collector, and subclass 95 for a heat exchanger with cleaning means.

198, Conveyors: Power-Driven, subclasses 494+ for conveyor cleaners.

201, Distillation: Processes, Thermolytic, subclass 2 for a carbonizing process directed to cleaning the apparatus.

202, Distillation: Apparatus, subclass 241 for means for cleaning and decarbonizing a retort or still.

86 With waste gas heat and/or power conservers:

This subclass is indented under the class definition. Apparatus including means to conserve heat from gases or vapors exhausted from the apparatus as by heat exchangers, means to use exhaust gases or vapors for heating purposes or the use of exhaust or treating gases or vapors to drive engines.

- (1) Note. Mere recirculation of gases or passing gases from chamber to chamber is excluded, being placed with the type of apparatus; see (1) Note to subclass 219 of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 62+, for means using gases drawn through a cooler or cooling section
68, for means using exhaust gas in two types of driers.
73+, for means for condensing vapors,
79, for means for burning waste products carried in gases or vapors.
427 and 513+.

SEE OR SEARCH CLASS:

- 60, Power Plants, appropriate subclasses.
165, Heat Exchange, subclass 66 for a combined heating and cooling device that includes a means for exchanging heat between supply and exhaust lines.
201, Distillation: Processes, Thermolytic, subclasses 13+ for a carbonizing process including the recovery of heat by indirect heat exchange.
203, Distillation: Processes, Separatory, subclasses 21+ for a process of distilling a liquid and recovering heat by indirect heat exchange.
220, Receptacles, and 234, for apparatus wherein the heater causes a gas circulation.
432, Heating, subclasses 78+ for a combustion type heater in which combustion air recovers heat from exiting work; subclass 82 for a heater in which entering work recovers heat

from exiting work; and subclasses 135+ for a heating chamber in which combustion feed materials recover heat from the chamber exhaust.

87 With means to interlock operable elements:

This subclass is indented under the class definition. Apparatus in which means are provided for interlocking or connecting various parts of the treating apparatus so that upon an operation of one part other operating elements are cut off, stopped or operated.

- (1) Note. Mere common drive means are not included but are found under appropriate type of apparatus.
(2) Note. Electrical connections for simultaneous energization or deenergization are included.
(3) Note. Compare automatic control subclasses 524+ and indented subclasses, and see notes.

SEE OR SEARCH CLASS:

- 101, Printing, subclasses 416.1+ for drying devices interlocked or synchronized with a press.
192, Clutches and Power-Stop Control, particularly subclass 116.5 and indented subclasses.

88 With display, inspecting, or illuminating means:

This subclass is indented under the class definition. Apparatus including means to display or inspect the solids undergoing treatment or to illuminate the apparatus.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 89, which contains, among other things, sampling devices, and see notes.
93, for apparatus primarily designed to use solar heat which may have glass covers.
201, (6) Note, for other treating enclosures.

SEE OR SEARCH CLASS:

- 62, Refrigeration, subclasses 433+ for refrigerating display apparatus.
99, Foods and Beverages: Apparatus, subclass 341.

- 210, Liquid Purification or Separation, subclasses 85+ for separators combined with signals or indicators.
- 220, Receptacles, subclasses 602, 662+ and 377+ for transparent closure.
- 221, Article Dispensing, and see the class definition for the distribution of art on article dispensing, per se.
- 312, Supports: Cabinet Structure, particularly subclasses 114+ for similar display apparatus.
- 220, Receptacles, subclass 82, and see the notes thereto, for structures wherein a transparent panel is mounted in a wall.
- 454, Ventilation, particularly subclasses 173+ for ventilated structures which may contain material.

89**With indicating or testing means:**

This subclass is indented under the class definition. Apparatus including means, such as weighers, samplers, thermometers, overflow indicators, and position indicators, for indicating or testing the operation of the apparatus.

- (1) Note. Compare this class, subclass 88, and see the notes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 524+, particularly subclasses 527+, for signals such as lights, bells, etc., combined with automatic controls,

SEE OR SEARCH CLASS:

- 73, Measuring and Testing, for pertinent subclass(es) as determined by schedule review.
- 116, Signals and Indicators, for pertinent subclass(es) as determined by schedule review.
- 198, Conveyors: Power-Driven, subclasses 502.1+.
- 340, Communications: Electrical, subclasses 500+.
- 374, Thermal Measuring and Testing, subclasses 141+ for a thermometer combined with a diverse art device.

89.1 Blotting means combined with means for purpose other than drying:

This subclass is indented under the class definition. Apparatus in which, in combination with means for removing liquids from material undergoing treatment by contacting the same with solid material which removes the liquids by absorption, there is means for any purpose other than drying and/or contacting solids with gas or vapor; or wherein, in combination with said liquids-removing means, there is means for attaching it to such other purpose means.

- (1) Note. Mere indicia or mere storage space intrinsic to blotting means structure (e.g., the interior of the cylinder of the rolling contact means of subclass 95.3) is not considered to be other purpose means for this subclass. Blotting means so claimed will be placed in subclasses 95.1+ (e.g., subclass 95.3).

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclass 105 for a patent to the combination of blotting means, with a penholder claimed in greater detail than is necessary to define a relationship of the blotting means thereto.
- 40, Card, Picture, or Sign Exhibiting, subclass 358 for blotting means combined with means for displaying a car, picture, or sign.
- 248, Supports, subclass 504 for a desk pad (of construction common to blotter holders) wherein the invention is to means to overlie and thereby hold-down another, planar article (e.g., glass panel).
- 281, Books, Strips, and Leaves, subclasses 3+ for blotting means combined with a book.
- 401, Coating Implements With Material Supply, subclass 52 or 195 for the combination of blotting means with a writing implement with material supply, where more of the implement is claimed than is necessary to define a relationship of the blotting means thereto.

89.2 With ruler:

This subclass is indented under subclass 89.1. Apparatus wherein the other purpose means is a geometrical instrument of the straightedge type.

90 Combined:

Apparatus under the subclass definition in which, in combination with the apparatus for drying and/or contacting solids with gases or vapors, there is apparatus for other purposes and not provided for above.

- (1) Note. The combined features are in addition to the apparatus for feeding, discharging, agitating or conveying the solids, heating, causing or directing gas or vapor flow for contact with the material undergoing treatment.
- (2) Note. For example, this subclass contains transportation means for the apparatus, power take-offs, means to protect persons from burning, as in hair driers, head rests, etc.
- (3) Note. For devices operable to relieve pressure, including safety devices, see this class, subclass 558, and for means to inject steam or water, including fire extinguishers, see subclass 83.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 91 and 111, for drum driers including a belt or felt and means to dry the belt or felt, and subclasses 71 and 95 for means to dry by contact with solid matter plus means to dry the solid matter.
- 427, for drying processes combined with a process of some other kind.

SEE OR SEARCH CLASS:

- 100, Presses, subclass 102 for presses not elsewhere provided for and combined with other features.

91 Convertible:

This subclass is indented under the class definition. Apparatus combined with or including means to convert the apparatus in whole or part to other apparatus not under the class definition

or into different types of apparatus within the class definition.

- (1) Note. Apparatus having a treating gas or vapor circulation in which the gas or vapor can be caused to flow over heating means or to bypass the heater are not here but in the appropriate subclasses below. See (1) Note to subclass 62 of this class.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 72+, for apparatus including means to inject substances into the gas so that the apparatus may have more than one function, as drying and moistening.

92 Vacuum:

This subclass is indented under the class definition. Apparatus for treating material under less than atmospheric pressure.

- (1) Note. The enclosure may be heated or treating gas or vapor circulated and such operation, if carried out under less than atmospheric pressure, is not considered a plural operation for subclass 60.
- (2) Note. The means must apply definite sub-atmospheric pressures and not merely cause the gas or vapor to flow onto or through the solids, for which see the appropriate type of apparatus.
- (3) Note. For other apparatus or classes which may include vacuum treating, see search notes referencing this (3) Note.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 191, for means for causing a pulsating gas or vapor flow.
- 242, 402+ and 558, and see notes.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclasses 300.1+ for air blast and/or suction cleaning apparatus. (See (3) Note above.)
- 48, Gas: Heating and Illuminating, subclasses 89+ and 119+. (See (3) Note above.)

- 62, Refrigeration, subclasses 100, 169 and 268+ for processes and apparatus for refrigeration involving vacuumizing an open outlet chamber. (See (3) Note above.)
- 99, Foods and Beverages: Apparatus, subclass 472. (See (3) Note above.)
- 127, Sugar, Starch, and Carbohydrates, subclass 16. (See (3) Note above.)
- 128, Surgery, subclass 204. (See (3) Note above.)
- 141, Fluent Material Handling, With Receiver or Receiver Coating Means, subclasses 65+ for apparatus for merely evacuating and/or gas or vapor charging receivers. (See (3) Note above.)
- 159, Concentrating Evaporators, subclasses 3, 17 and 22+. (See (3) Note above.)
- 196, Mineral Oils: Apparatus, particularly subclass 114 for apparatus adapted for distilling a mineral oil under reduced pressure. (See (3) Note above.)
- 198, Conveyors: Power-Driven, subclass 803 for rotary transfer valves. (See (3) Note above.)
- 201, Distillation: Processes, Thermolytic, subclass 35 for a process of carbonizing under less than atmospheric pressure. (See (3) Note above.)
- 202, Distillation: Apparatus, particularly subclass 205. (See (3) Note above.)
- 203, Distillation: Processes, Separatory, subclasses 74+ and 91+ for a process of distilling a liquid under less than atmospheric pressure. (See (3) Note above.)
- 220, Receptacles, appropriate subclass for receptacle structure. (See (3) Note above.)
- 373, Industrial Electric Heating Furnaces, subclasses 54, 63, 110+, and 140+. (see (3) Note above.)
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 285+ and 307+.
- 93 Solar:**
This subclass is indented under the class definition. Apparatus peculiarly adapted for the use of solar energy to treat material.
- (1) Note. For frames for supporting hair on the head while drying, see this class, subclass 96.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
88,
- SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 17.
60, Power Plants, subclasses 641.1+.
126, Stoves and Furnaces, subclasses 561+ and 569+ and in particular subclass 680 for a solar energy concentrator with a support for material heated.
220, Receptacles, subclasses 377, 602, and 662+, for a receptacle having a transparent wall or closure.
250, Radiant Energy, subclass 253 for apparatus to irradiate material within or on the earth, subclass 324 for the corona irradiation of material or an object, subclasses 453.1+ for apparatus to support an object for irradiation.
- 94 Sheet or web contact preventing by spacer sheets, webs, or strands:**
This subclass is indented under the class definition. Apparatus in which sheets, webs or strands are dried while spaced from one another or parts of a web are spaced from other parts by means of spacer sheets, webs or strands.
- (1) Note. Complete the search in this class, process subclass 306, and see notes thereto.
- SEE OR SEARCH CLASS:
101, Printing, subclasses 417 and 419, for such devices claiming no positive drying.
226, Advancing Material of Indeterminate Length, for other sheet or web handling.
271, Sheet Feeding or Delivering, appropriate subclasses for other sheet or web handling.
270, Sheet-Material Associating, particularly subclasses 58.01+ for other means for associating sheets, see Class

95 Means to remove liquid from treated material by contact with solids:

This subclass is indented under the class definition. Apparatus including means to remove liquids from the material undergoing treatment by contacting the same with solid material which removes the liquids by adsorption, absorption or adhesion.

- (1) Note. Where the absorption or adsorption means are claimed, the patent is in this subclass or in subclass 71, except external drums having absorbent or adsorbent belts or felts (subclasses 116 and indented subclasses and 123) and absorbent or adsorbent spacer sheets or webs (subclass 94).

SEE OR SEARCH THIS CLASS, SUBCLASS:

71 and 329+.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, appropriate subclasses for means for cleaning which may remove liquids by brushing, wiping or squeegeeing; particularly subclasses 21.1+, 97.1+, 105, 147.1, and 159.1 and their indented subclasses; 208, 235, 245, and 250.001 and indented subclasses. Razor blade driers designed to wipe as well as absorb are in Class 15, subclass 218.
- 30, Cutlery, subclass 537.
- 101, Printing, particularly subclasses 417 through 419, for contact absorbers associated with a printing press.
- 206, Special Receptacle or Package, subclasses 16 and 47 for packages which may contain an absorption drier for blades.
- 248, Supports, subclass 504 for a desk pad; i.e., the desk article with its overlying means to hold down an edge or corner of a sheet other than a blotter.
- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a structurally defined web or sheet, or for a coated or structurally defined fiber or filament or a mass of such fibers or filaments which may be disclosed as useful for contacting and

thereby removing liquids from work, and see especially subclasses 304.4+ for a plural layer web or sheet having a component which is porous or cellular.

95.1 Having manipulative means:

This subclass is indented under subclass 95. Apparatus including means facilitating manual engagement thereof for transportation to, contact with, and removal from the material to be dried.

- (1) Note. The means facilitating handling may be a mere, stiffening insert.
- (2) Note. Apparatus which is so manipulated that the work-contacting face (e.g., the cylindrical face of indented subclass 95.3 or the arcuate face of subclass 95.4) wipes a work surface by being drawn there across, will be placed in Class 15, Brushing, Scrubbing, and General Cleaning, in accordance with (4) Note in principal subclass 95.

SEE OR SEARCH CLASS:

- 428, Stock Material or Miscellaneous Articles, appropriate subclasses for a blotter which is mere stock material, and see especially subclasses 311.11+ and 357+.

95.2 Attachable to hand (e.g., finger):

This subclass is indented under subclass 95.1. Apparatus wherein the means facilitating manual engagement is adapted to be secured to the hand.

95.3 For rolling contact:

This subclass is indented under subclass 95.1. Apparatus in which the solid material for removing liquids is arranged in the form of a cylinder for rolling contact with a work surface so that any point therein can contact a point only of said surface.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 89.1, for a rolling-contact blotter attachment for a pen.

95.4 For rocking contact:

This subclass is indented under subclass 95.1. Apparatus in which the solid material for removing liquids is arranged to provide an arcuate work-contacting surface, whereby the apparatus is capable of arcuate oscillation so that any point thereon can contact a point only of the work surface.

96 For hair on head:

This subclass is indented under the class definition. Apparatus coming including means specialized to dry the hair on the human head.

- (1) Note. For hair drying processes, see the search notes below. All apparatus disclosures have been cross-referenced to appropriate apparatus subclasses.
- (2) Note. This subclass and the indented subclasses do not include mere hot air blowers for which see other appropriate class noted below. Also see (1) Note to subclass 97 of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 73+, for apparatus in this class for treating gases or vapors by vapor condensation.
- 80+, for apparatus in this class for treating gases or vapors by absorption.
- 283, for hair drying processes.

SEE OR SEARCH CLASS:

- 2, Apparel, particularly subclass 174 or shields, not attached to the hair drying hood, for the face and other parts of the body.
- 15, Brushing, Scrubbing, and General Cleaning, subclass 160 for heated brushes.
- 126, Stoves and Furnaces, subclass 99 and indented subclasses, for hot air blowers including combustion means for indirectly heating the air.
- 132, Toilet, subclass 14.
- 132, Toilet, for a hair dryer combined with other means for treating the hair, see particularly subclasses 227+ for curlers combined with heaters, and subclass 271 for a dryer combined with a brush.

- 165, Heat Exchange, subclasses 122+ or an encased blower moving air through a heat exchanger.
- 219, Electric Heating, appropriate subclasses, especially subclasses 280+ for means for heating gases by electricity.
- 237, Heating Systems, particularly subclass 50 and indented subclasses for heating systems adapted to distribute a heating fluid to a plurality of points but not claiming means specialized for hair drying.
- 604, Surgery, for hair driers including means to medicate the hair, subclasses 23 and 291 for hair dryers including hair medicating.

97 With gas or vapor flow for contact:

This subclass is indented under subclass 96. Apparatus including means to circulate a gas or vapor in contact with the hair.

- (1) Note. For hand driers and miscellaneous blowers and distributors, see this class, subclass 202.
- (2) Note. For a gas or vapor hair dryer combined with other means for treating the hair, see Class 132 Toilet, particularly subclass 228 for those combined with a curler, and subclass 271 for those combined with a brush.
- (3) Note. For a gas or vapor hair dryer combined with other treating means, see Class 132 Toilet, particularly subclass 228 for those combined with a curler, and subclass 271 for those combined with a brush.

SEE OR SEARCH CLASS:

- 219, Electric Heating, subclasses 369+, for mere blowers plus electrical heating means.

98 Plural distributors:

This subclass is indented under subclass 97. Apparatus including a plurality of gas or vapor distributing units.

- (1) Note. See (6) Note to subclass 96 of this class.

99 Head conforming distributor:

This subclass is indented under subclass 97. Apparatus including a distributor unit conforming to the shape of the head. Usually this is a hood or ducts fitting around the head.

100 Recirculation of treating gas or vapor:

This subclass is indented under subclass 99. Apparatus including means to recirculate the treating gas or vapor.

- (1) Note. For other subclasses involving gas or vapor recirculation see (1) Note to subclass 219 of this class.

101 With hair supports:

This subclass is indented under subclass 97. Apparatus including means to support the hair, such as racks or supports.

- (1) Note. Complete the search in this class, subclass 96 for hair supports not provided with means to circulate a gas or vapor into contact with the hair.

SEE OR SEARCH THIS CLASS, SUBCLASS:
239, of this class.

102 Treated material recirculating means:

This subclass is indented under the class definition. Apparatus having means to recirculate the treated material in whole or part through the material treating zone or through a part of such zone.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 95, for means to recirculate solids which contact the material undergoing treatment to dry the same.
- 376+, for corresponding processes.
- 576+, for fluid current type driers provided with material recirculating means, and see notes.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclass 580 for plural conveyors arranged to recycle all or a portion of the conveyed load on a closed path, and subclass 720 for a pusher conveyor having the same arrangement.

103 Forms:

This subclass is indented under the class definition. Apparatus in which the article is held on or in forms, and forms not otherwise provided for.

- (1) Note. Complete the search in this class, process subclasses 437+ and see the notes thereto.
- (2) Note. Hollow articles held on mandrels inserted in the hollow are in this class, subclass 104 and indented subclasses.
- (3) Note. Patents for treating articles while held between pressing members or platens are not here but in subclass 143 and indented subclasses of this class.
- (4) Note. The line between the patents in this class and Class 223, Apparel Apparatus is: Class 223 takes all patents claiming features of a form to fit or hold a garment. Class 34 takes patents claiming forms by name only as “forms”, “flat forms”, “garment forms”, “boards”, or a particular named garment as “stocking forms”, where no features of the form except such designation by name are claimed.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 151 and 163, for means for holding sheets, webs or strands.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 803.3+ and 867.01+ others for a conveyor having a load holder.

104 For hollow article:

This subclass is indented under the class definition. Apparatus restricted to operating on hollow articles.

- (1) Note. The patents on apparatus for hollow articles include means for introducing and/or withdrawing from the interior of the article either the treating medium or the means for handling the article. Apparatus restricted to treating hollow

cakes or bobbins of strands is in this subclass or indented subclasses.

- (2) Note. Devices of more general application claiming a hollow article by name only are classified in appropriate subclasses below, for instance, racks for hose or strands, for which see subclasses 151 and appropriate indented subclasses, and 239.
- (3) Note. For gas or vapor delivery means insertable into bulk material, search this class, subclass 243 and Class 454, Ventilation, subclasses 175+.
- (4) Note. Complete the search in this class, apparatus subclass 103 and process subclasses 437+, and see the notes thereto.
- (5) Note. See this class, subclass 202 where articles, particularly shoes, are inserted into openings in a treating chamber.

SEE OR SEARCH CLASS:

- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 150+ and 451.
- 12, Boot and Shoe Making, appropriate subclasses for forms inserted in shoes, and particularly subclass 129.4 for heated forms.
- 68, Textiles: Fluid Treating Apparatus, subclass 150.
- 427, Coating Processes, subclasses 230+ for processes of coating the interior of a hollow article.
- 432, Heating, subclass 224 for an in an inserted emitter type of hollow article interior heater.

105 With conveying or handling means:

This subclass is indented under subclass 104. Apparatus including means to move the articles from one point to another during treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

103,

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 388 and 803.12 for a conveyor having means contacting the interior of a hollow load.

106 With suspension means and bottom retainer:

This subclass is indented under subclass 104. Apparatus having means to suspend hollow articles and means to hold the bottom portion thereof.

- (1) Note. Most of the patents herein are clothes driers with means for driving a gas up through the garment thus causing inflation and drying.

107 For slender rigid articles:

This subclass is indented under the class definition. Apparatus including means specially designed for holding or handling slender substantially rigid articles, such as rods.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 104, and indented subclasses, for apparatus restricted to hollow articles.
- 148+, for treating and handling of flexible material.

SEE OR SEARCH CLASS:

211, Supports: Racks, subclasses 60.1+ for racks for slender articles.

108 Rotary drums or receptacles:

This subclass is indented under the class definition. Apparatus including a hollow drum or receptacle member through, over, by, or in which the material is carried to be treated and rotating about an axis.

- (1) Note. Usually the axis coincides with the axis of the drum or receptacle. The member is usually, but not always, circular in cross section.
- (2) Note. Drums and rollers that are mere conveyor guides or in themselves are mere conveyors or material feeders are not here but in other subclasses appropriate to the type of apparatus.

- (3) Note. For drums with inspection or sampling means, see this class, subclasses 88 and 89.
- (4) Note. For drums using both internal and external surfaces for the solid material undergoing treatment, see this class, subclass 68.
- (5) Note. For additional classes and subclasses involving rotary drums or receptacles see the search notes below referencing this (5) Note.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 184, and indented subclasses, for rotary carriers or racks.

SEE OR SEARCH CLASS:

- 15, Brushing, Scrubbing, and General Cleaning, subclasses 75 and 90. (See (5) Note above).
- 55, Gas Separation, subclasses 290, 354 and 400. (See (5) Note above).
- 68, Textiles: Fluid Treating Apparatus, particularly subclasses 16, 20, 58, and 139+. (See (5) Note above).
- 69, Leather Manufactures, subclass 30. (See (5) Note above).
- 99, Foods and Beverages: Apparatus, subclass 323.9, for rotary drum cereal poppers: subclass 443, and see note II thereto, for movable food supports; and subclass 630, for a rotary container with skin removal means. (See (5) Note above).
- 110, Furnaces, subclass 226. (See (5) Note above).
- 131, Tobacco, subclass 305. (See (5) Note above).
- 134, Cleaning and Liquid Contact With Solids, (see (5) Note above).
- 159, Concentrating Evaporators, subclasses 9.2, 10-12. (See (5) Note above).
- 165, Heat Exchange, subclasses 89+. (See (5) Note above).
- 198, Conveyors: Power-Driven, subclass 658. (See (5) Note above).

- 201, Distillation: Processes, Thermolytic, appropriate subclass for a process of carbonizing carbonaceous material. (See (5) Note above).
- 202, Distillation: Apparatus, particularly subclasses 100, 131, 136, 216, 218, and 238. (See (5) Note above).
- 209, Classifying, Separating, and Assorting Solids, subclasses 238, 288 and indented subclasses, particularly subclass 295. (See (5) Note above).
- 210, Liquid Purification or Separation, subclasses 210+, 217, 297, 326, 360.1+, 384+, 385, 391+, and 402+. (See (5) Note above).
- 241, Solid Material Comminution or Disintegration, subclasses 54, 70+, 91, 137, 153, and 176+. (See (5) Note above).
- 366, Agitating, subclasses 22+ for a heating or drying mortar mixing chamber, and subclasses 54+ and 220+ for rotatable mixing chambers having no claimed drying or gas or vapor contact means.
- 384, Bearings, subclass 549 for a fixed supporting roller. (See (5) Note above).
- 404, Road Structure, Process, or Apparatus, subclasses 83+. (See (5) Note above).
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses 209+. (See (5) Note above).
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 303 and 312. (See (5) Note above).
- 451, Abrading, subclasses 106 and 326+ and indented subclasses. (See (5) Note above).
- 432, Heating, subclasses 103+ for a residual tumbler type rotary furnace.

109

Compartmented or pocketed:

This subclass is indented under subclass 108. Apparatus in which the material is carried in two or more distinct compartments.

- (1) Note. The pocketed or compartmented type is distinguished by the fact that the material is fed to and discharged from at least two distinct pockets or compartments separately.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 127, and indented, subclasses for plural internal drums or receptacles.
 184 and 614+, and indented subclasses.
- 110 External:**
 This subclass is indented under subclass 108. Apparatus in which the material is carried on the outside surface of a rotary treating drum.
- (1) Note. This subclass includes among other structure not provided for below, drum mounting or driving means, drum structure and drums heated other than by exchange fluids.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 611, and indented subclasses, subclass 625 for sheet, web or strand driers not of the external drum type.
- SEE OR SEARCH CLASS:
 38, Textiles: Ironing or Smoothing, appropriate subclasses for external rotary drum textile ironers or smoothers.
 198, Conveyors: Power-Driven, appropriate subclasses for rotary conveyors, particularly subclasses 608, 611+ and 803.16.
 432, Heating, subclass 228 for an internally heated work supporting roll.
- 111 With belt or felt drier:**
 This subclass is indented under subclass 110. Apparatus having belts or felts as defined in subclass 116 and also means to dry such belts or felts.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 71, 95+ and 329+, for processes or means to dry material by contact with solid matter including means to dry the solid matter, and see notes to these subclasses.
 90, for driers combined with other features.
 116+ and 123.
- SEE OR SEARCH CLASS:
 432, Heating, subclass 59 for a residual heater including an internally heated roll flexing, looping or coiling a sheet, web or strand.
- 112 With hopper feed or article securing means:**
 This subclass is indented under subclass 110. Apparatus including a hopper feeding means or distinct article securing means.
- (1) Note. For drums including material retaining belts or felts, see this class, subclasses 111, 116 and 123.
- 113 Plural:**
 This subclass is indented under subclass 110. Apparatus in which two or more drums of the external type are claimed in combination.
- 114 Gas or vapor circulation for contact with treated material:**
 This subclass is indented under subclass 113. Apparatus including means to contact the solids undergoing treatment with a gas or vapor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 117, where the sheet web or strand is fed through the drum assembly by fluid (usually air) blasts.
 122, for single drums having this combination.
- 115 Through material or introduction through drum:**
 This subclass is indented under subclass 114. Apparatus in which the treating fluid is passed through the treated material and/or through the drum surface.
- 116 With belts or felts:**
 This subclass is indented under subclass 113. Apparatus in which belts or felts are provided for holding the material against the drum or against an intermediate belt or felt which contacts the drum.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 123, and in subclass 111, for belt or felt driers, and see the notes thereto.
 523, for belts or felts, per se.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, sub-classes 688.1+ for means for holding a conveyed load against its conveyor, and subclasses 604+ and 620+ for opposed, load gripping conveyors.

117 With threading, stripping, or guiding devices:

This subclass is indented under subclass 116. Apparatus in which means to strip the material from the drums or to guide or thread it through the drum assembly are provided.

- (1) Note. Complete the search in this class, subclass 120 for such devices without belts, and see notes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

85, for apparatus cleaners.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, sub-classes 367+, 370.07 through 370.09, 370.1, 370.11 through 370.13, 426+, 463.1, 497, 597+, 599, 637, and others for means for moving an article or material off a conveyor.

118 Tightener:

This subclass is indented under subclass 116. Apparatus in which there is a tightener for the belt or belts.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, sub-classes 709 and 813+ for conveyor belt tighteners.
242, Winding, Tensioning, or Guiding, subclasses 410+ and 147+ for tensioning a running length of elongated material.

119 Heat exchange fluid supply and/or removal:

This subclass is indented under subclass 113. Apparatus including means to supply and/or remove the heat exchange fluids from the drums.

- (1) Note. While some of the patents included here include nonautomatic means to control the pressure throughout

the drums, such as restrictions in the feed or discharge lines, this subclass does not include means responsive to a condition to be controlled to actuate a condition controlling means. Complete the search in this class, subclasses 524+ and indented subclasses, particularly subclasses 549+ and 556, which contain such devices.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

124 and 125, for single drums.

SEE OR SEARCH CLASS:

237, Heating Systems, subclasses 67 and 68 for steam heating systems.

120 Threading, stripping, or guiding devices:

This subclass is indented under subclass 113. Apparatus including means to strip the material from the drums or to thread, or guide the material through the drum assembly.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

85, for apparatus cleaners.
117, for such devices with belts.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, sub-classes 367+, 370.07 through 370.09, 370.1, 370.11 through 370.13, 426+, 463.1, 497, 597+, 599, 637, and others for means for moving an article or material off a conveyor.
226, Advancing Material of Indeterminate Length, appropriate subclasses for methods of, and apparatus for, feeding material without utilizing the leading or trailing ends to effect movement of the material.
254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 389+.
474, Endless Belt Power Transmission Systems or Components, appropriate subclasses for a device for guiding or driving an endless belt in a power transmission.

121 Mounting and/or driving means:

This subclass is indented under subclass 113. Apparatus including drum mounting and/or driving means.

- (1) Note. See Class 475, Planetary Gear Transmission Systems or Components, appropriate subclasses, for plural loads driven by planetary gearing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 113, for plural drum arrangements where the drum mounting or drive is conventional.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, appropriate subclasses, particularly subclasses 650 and 665+.

122 Gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 110. Apparatus including means to contact the solids with a gas or vapor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 114 and 115.

123 With belts or felts:

This subclass is indented under subclass 110. Apparatus in which belts or felts as defined in subclass 116 are used.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 111,

SEE OR SEARCH CLASS:

- 162, Paper Making and Fiber Liberation, subclasses 358.1+ for press roll couples having a belt or felt for conveying a moist fibrous web therethrough.
198, Conveyors: Power-Driven, subclasses 688+ for means for holding a conveyed load against its conveyor, and subclasses 604+ and 620+ for opposed, load gripping conveyors.

124 Heat exchange fluid supply and/or removal:

This subclass is indented under subclass 110. Apparatus including means to supply and remove the heat exchange fluid.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 119, for plural drums.

SEE OR SEARCH CLASS:

- 165, Heat Exchange, subclasses 89+ for a rotary drum heat exchanger.
285, Pipe Joints or Couplings, particularly subclasses 120.1+ especially subclasses 121.3+, for the coupling means, per se. See the Search Notes thereunder.

125 Removal only:

This subclass is indented under subclass 124. Apparatus claiming only means to remove the heat exchange fluid.

- (1) Note. These devices are mainly for handling the condensed steam.

SEE OR SEARCH CLASS:

- 137, Fluid Handling, subclasses 123+ for siphons, and subclasses 171+ for traps for separating condensate from steam, or any two diverse fluids.

126 With additional translating means:

This subclass is indented under subclass 108. Apparatus in which means are provided for moving the drum or receptacle in some manner in addition to the rotary motion of the drums. For instance, the entire assembly may be mounted on wheels, the drums may be conveyed as by chains, roll down tracks or moved by other means including means to adjust the position of the drum bearings, and drums mounted for rotation about an axis other than the axis of rotation of the drum or receptacle.

- (1) Note. Mere motion of the drum or receptacle to cause feeding and/or discharging of the material treated is placed with the appropriate apparatus groups below.

- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, sub-classes 861.1+ for an adjustable conveyor frame.
- 127 Plural:**
This subclass is indented under subclass 108. Apparatus including a plurality of drums through or into which material undergoing treatment is passed.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
109, for plural compartment drums.
126, for plural translating drums.
- 128 One within another (e.g., nested):**
This subclass is indented under subclass 127. Apparatus including a plurality of drums nested one within another. The material usually passes from one drum to another in a zigzag path.
- 129 With feed from one to another:**
This subclass is indented under subclass 127. Apparatus including means to feed material from one drum to another.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
128, for nested rotary drums or receptacles.
135+, 141 and 142, for other drums or receptacles in which the material moves through the drum or receptacle.
165+, and indented subclasses, for gravity feed type driers.
- 130 With gas or vapor flow for contact with treated material:**
This subclass is indented under subclass 108. Apparatus including means to contact the material undergoing treatment with a gas or vapor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
140 and 141, for drums or receptacles having foraminous walls which act only to vent gases or vapors.
- 131 Recirculation of treating gas or vapor:**
This subclass is indented under subclass 130. Apparatus including means to recirculate the treating gas or vapor.
- (1) Note. See (1) Note to subclass 219 of this class for other subclasses involving gas or vapor recirculation.
- 132 With heating means:**
This subclass is indented under subclass 130. Apparatus including heating means for either, or both, (1) the treating gas or vapor, or (2) the material undergoing treatment.
- (1) Note. Such means may include gas or vapor conducting conduits which act to heat as well as conduct gases and/or vapors into the apparatus, for which see this class, subclass 134 and notes.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
131, for the subject matter provided for in this subclass, plus recirculation of the treating gas or vapor.
- 134 Heat exchange and/or gas or vapor conducting conduits in drum or receptacle:**
This subclass is indented under subclass 132. Apparatus in which either or both, (1) indirect heat exchange conduits, or (2) conduits for conducting the treating gas or vapor are located within the drum or receptacle.
- (1) Note. The conduits may be part of or attached to the drum or receptacle walls.
- (2) Note. For other treating gas or vapor conduits without heating means, search this class, subclass 138.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
280+,
- 135 Axial treated material feed type:**
This subclass is indented under subclass 130. Apparatus of the type in which the material to be treated is introduced into one end of the drum or receptacle, travels along the interior in the direction of the axis of rotation, and is discharged from the other end.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
127, and indented subclasses.
134, for the subject matter there provided for, including axial material flow.
- 136 Concurrent gas or vapor flow only:**
This subclass is indented under subclass 135. Apparatus in which the gas or vapor that contacts the material is introduced into and discharged from the same ends as the treated material, i.e., the directions of flow of the material being treated and the treating gas and/or vapors are the same.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
135, for this character of gas or vapor flow combined with other characters of flow.
- 137 Countercurrent gas or vapor flow only:**
This subclass is indented under subclass 135. Apparatus in which the gas or vapor that contacts the material is introduced at the material discharge end and is discharged at the material feed end, i.e., the directions of flow of the material being treated and the treating gas and/or vapor are opposite.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
135, for this character of gas or vapor flow combined with other characters of flow.
- 138 Gas or vapor conducting conduits in drum or receptacle:**
This subclass is indented under subclass 130. Apparatus wherein conduits for conducting the treating gas or vapor for contact with the material undergoing treatment are located within the drum or receptacle.
- (1) Note. The conduits may be part of or attached to the drum walls.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
134 and 280+.
- 139 With drum or receptacle enclosing housing:**
This subclass is indented under subclass 130. Apparatus in which the drum or receptacle is totally or partially enclosed in a housing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
135 through 138, for the subject matter there provided for plus enclosing housings.
595+, for such housings combined with heating means, and in subclass 131.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclasses 860.1+ for a conveyor casing.
- 140 Vapor exhaust:**
This subclass is indented under subclass 108. Apparatus having means to exhaust the gases or vapors generated or evolved from the solid material undergoing treatment.
- (1) Note. Exhaust means does not include an open end but does include foraminous walls.
- 141 Axial treated material feed type:**
This subclass is indented under subclass 140. Apparatus having treated material feed there-through as defined in subclass 135.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
127, and indented subclasses.
- 142 Axial treated material feed type:**
This subclass is indented under subclass 108. Apparatus having treated material feed there-through as defined in subclass 135.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
127, and indented subclasses.
- 143 Stationary press type:**
This subclass is indented under the class definition. Apparatus in which the material to be treated is held between two opposed members which are movable or expansible towards one another to press or retain the material, and away from each to release the material. Usually

at least one member is a fixed bed supporting the material.

- (1) Note. Opposed conveying, feeding or discharging means which may apply pressure to the material conveyed are not here, but are with the appropriate type of apparatus; see particularly subclasses 110+, for external drum type, and the various subclasses under subclasses 201+, particularly subclasses 203+.
- (2) Note. For devices wherein an absorbent member claimed as such contacts an article to be dried, see this class, subclasses 95+ and for other drying combined with absorbing, see subclass 71 and for spacing sheets or webs by alternate spacer sheets or webs, see subclass 94.
- (3) Note. For driers combined with expressing or wringing, see this class, subclass 70.
- (4) Note. For textile washing and wringing presses, see Class 68, Textiles: Fluid Treating Apparatus, particularly subclasses 94 and 241 and their indented subclasses.
- (5) Note. For baling, expressing, copying, packing, and bundling presses, see Class 100, Presses, particularly subclasses 211+ for presses having a flexible or deformable pressure surface, and subclasses 214+ for reciprocating platen presses not elsewhere provided for.
- (6) Note. For similar treating presses, see Class 144, Woodworking, subclasses 256.1+.
- (7) Note. For heat exchanger platens, per se, see Class 165, Heat Exchange, subclasses 168+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
437+, for processes involving drying on forms.

SEE OR SEARCH CLASS:
38, Textiles: Ironing or Smoothing, appropriate subclasses.

- 162, Paper Making and Fiber Liberation, subclasses 377+ for apparatus for making articles from fibrous pulp wherein a heated die is employed.
- 425, Plastic Article or Earthenware Shaping or Treating: Apparatus, appropriate subclasses for a molding press for plastic product manufacturing, especially subclasses 363+ for a press couple including an endless surface, subclasses 394+ for a press type preform reshaping or vulcanizing means, and subclasses 406+ for a press couple forming apparatus; see the search notes under the above identified subclasses.

144 **Plural press units:**

This subclass is indented under subclass 143. Apparatus including a plurality of press couples. These may constitute single or plural machines.

- (1) Note. For other means for feeding material in plural independent paths, see this class, subclass 205.

SEE OR SEARCH CLASS:

- 100, Presses, subclasses 193+ for plural presses not elsewhere provided for.

145 **Gas or vapor circulation for contact with treated material:**

This subclass is indented under subclass 143. Apparatus including means to pass a gas or vapor into contact with the material treated.

- (1) Note. Presses with heated vented platens or presses having heated platens which separate to allow gas or vapor circulation (breathing) are not classified here but in other appropriate subclasses in this group.

SEE OR SEARCH CLASS:

- 100, Presses, subclasses 92+ for presses, not elsewhere provided for, having means to heat, cool or dry the material pressed.

146 Nonplanar press couples:

This subclass is indented under subclass 143. Apparatus in which the pressing members, of nonplanar form are shaped to hold a solid to be treated. Many of these are matrix driers.

147 Spiral treated material path type:

This subclass is indented under the class definition. Apparatus in which the material undergoing treatment travels in a generally spiral or helical path.

- (1) Note. For the most part the material moves by gravity, sliding down a spiral guide or being carried on supports which move along a spiral path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 165, and indented subclasses, for shafts for material moving downwardly by gravity in various irregular paths.

SEE OR SEARCH CLASS:

- 193, Conveyors, Chutes, Skids, Guides, and Ways, subclasses 12 and 13.
198, Conveyors: Power-Driven, subclasses 657+ and 778 and indented subclasses.

164 Treated material vibrating type:

This subclass is indented under the class definition. Apparatus including means to vibrate supports for material undergoing treatment, thus vibrating the material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 85, for apparatus including means to strike the apparatus to loosen the material or deposits.
172 and 178, for gravity feed from shelf to shelf, the shelves not vibrating.

SEE OR SEARCH CLASS:

- 165, Heat Exchange, subclasses 86+.
198, Conveyors: Power-Driven, subclasses 631, and 752+ for a vibrating conveyor.

165 Gravity flow type:

This subclass is indented under the class definition. Apparatus in which material is fed in at an elevated level and flows generally downward through the treating zone or from one treating zone to another at least in part by gravity.

- (1) Note. This subclass and the indented subclasses do not include plural conveyors feeding one to another usually by gravity, for which see this class, subclass 203 and indented subclasses, nor conveyors or cars which carry the material, the material not flowing, for which see subclasses 194, and 201 and indented subclasses, particularly subclasses 215, 216, 227, and 228.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 58 and 59, for apparatus involving centrifugal force, subclass 164, for material vibrating type, and subclass 147, for spiral path type.
64+, for devices here provided for plus cooler or cooling sections.

SEE OR SEARCH CLASS:

- 159, Concentrating Evaporators, subclasses 13 and 15.
165, Heat Exchange, subclass 93.
198, Conveyors: Power-Driven, subclasses 311, 359+ and 523+.
202, Distillation: Apparatus, subclass 221.
432, Heating, subclasses 95+ for a residual gravity flow shaft type material heater.

166 Trough or tube, with axially rotary conveyor or agitator:

This subclass is indented under subclass 165. Apparatus having two or more troughs and/or tubes having therein agitators or conveyors rotating about and extending along the axis of the troughs or tubes.

- (1) Note. The gravity flow is usually from one trough or tube to the next.
(2) Note. Complete the search in this class, subclasses 180, 182 and 183, for other axial feed apparatus where there is no

gravity feed from one trough or tube to another, and see the notes to subclass 179.

167 Plural gravity path, plural feed, and/or discharge:

This subclass is indented under subclass 165. Apparatus having two or more separate gravity feed paths and either, or both, (1) two or more separate feeding means to two or more of such paths, or (2) two or more separate discharge means from two or more of such paths.

- (1) Note. There may be a nongravity feed from one such path to a second, i.e., series arrangements with nongravity feed therebetween.
- (2) Note. For plural gravity feed paths with single feed and discharge, see other appropriate subclasses of this group.

168 With gas or vapor flow for contact with treated material:

This subclass is indented under subclass 165. Apparatus including means to contact the material treated with a treating gas or vapor.

169 Recirculation of treating gas or vapor:

This subclass is indented under subclass 168. Apparatus including provision for recirculating the treating gas or vapor in whole or part.

- (1) Note. See (1) Note to subclass 219 of this class for other subclasses involving recirculation of the treating gas or vapor.

170 Inverted imperforate ducts:

This subclass is indented under subclass 168. Apparatus in which the treating gas or vapor is distributed into contact with the material by imperforate members of generally inverted "V" or "U" configuration.

171 Shelf-to-shelf or zigzag treated material flow:

This subclass is indented under subclass 168. Apparatus in which there is either, or both, (1) arrangement for dropping material from one shelf member to a lower shelf member, or (2) plural baffle members forming a tortuous or zigzag course for the material being treated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 164, for vibrating shelves.
- 178, for such structure without gas or vapor contact means.
- 211, for superposed floors where no means for gravity flow are claimed.

SEE OR SEARCH CLASS:

- 366, Agitating, subclasses 336+ for baffles in a stationary mixing chamber.
- 432, Heating, subclasses 130+, for a material heater of the shelf-to-shelf type having combustion products generating structure.

172 Dumping shelves or pockets:

This subclass is indented under subclass 171. Apparatus involving dumping shelves or pockets which oscillate or rotate about a horizontal axis for dumping the material from an upper to a lower level.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 194, for means for dumping removable shelves or trays.
- 237, for dumping floors, per se.

173 Rotary stirrer or shelf:

This subclass is indented under subclass 171. Apparatus including shelves and/or stirrers that rotate or revolve about a substantially vertical axis.

- (1) Note. The stirrer blades are usually arranged at an angle to move the material towards the discharge which may be radial openings in the shelves or openings at the edges or center.
- (2) Note. Complete the search in this class, subclasses 179+, for stationary receptacle with agitator and conveyor, and in subclass 185, for revolving or swinging carrier with discharging scrapers.

SEE OR SEARCH CLASS:

- 366, Agitating, appropriate subclasses, particularly subclasses 279+, and 432, Heating, subclass 131 for a shelf-to-shelf material heater having a rotary

pusher and combustion products generating structure.

174 Foraminous distributors or walls:

This subclass is indented under subclass 168. Apparatus including ducts or walls provided with a plurality of openings for the purpose of distributing the treating gas or vapor into contact with the material treated.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 168, for the subjects matter there provided for, including foraminous walls.
- 175, for heating by radiation and conduction plus venting means including foraminous walls.
- 225 and 233.

SEE OR SEARCH CLASS:

- 454, Ventilation, subclasses 174+.

175 With venting means or wall:

This subclass is indented under subclass 165. Apparatus including means to vent the gases or vapors given off by the material treated.

- (1) Note. Venting means does not include an open top.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 140 and 235.

176 With treated material tubes:

This subclass is indented under subclass 165. Apparatus in which the material moves through tubes.

177 With heating tubes:

This subclass is indented under subclass 165. Apparatus including in- direct heat exchange tubes for the material being treated.

- (1) Note. Complete the search for combined material and heating tubes in this class, subclass 176.

178 Shelf-to-shelf or zigzag treated material flow:

This subclass is indented under subclass 165. Apparatus having shelf to shelf or zigzag structure as defined in subclass 171.

- (1) Note. Notes to subclass 171 and indented subclasses apply here.

179 Stationary receptacle or tube with agitator or conveyor:

This subclass is indented under the class definition. Apparatus including a stationary receptacle or tube that receives and holds the material undergoing treatment in contact with at least the receptacle or tube bottom, and has either, or both, (1) an agitator for the material within the receptacle or tube, or (2) a conveyor (other than an endless conveyor); see note (3) for causing the material to move in the receptacle or tube.

- (1) Note. Complete the search in this class, subclasses 280+ for the type of apparatus classified in this subclass, and the indented subclasses, disclosed for treating feathers.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 165+, particularly subclass 166, for such devices in which the agitators or conveyors are vertically spaced so that the material undergoing treatment moves by gravity from one to another. Subclass 166 consists of plural apparatus similar to those classified in this subclasses (179+).
- 201+, for houses, kilns or receptacles in which the material does not contact the receptacle bottom, i.e., some conveyor or support for the material prevents contact with the house, kiln or receptacle bottom. Also, as between subclass 179, and subclasses 201+, all endless conveyors are in subclasses 201+.
- 241,

SEE OR SEARCH CLASS:

- 159, Concentrating Evaporators, subclasses 22+ and 32+.
- 165, Heat Exchange, subclass 94 for a scraper removing a product from a heat exchange surface, subclass 109.1 for a heat exchanger with agitator or stirrer, and subclass 120 for an impeller or conveyor moving material through a heat exchanger.

- 198, Conveyors: Power-Driven, sub-classes 396+, 582 and 616.
366, Agitating, subclasses 241+.
- 180 Plural units:**
This subclass is indented under subclass 179. Apparatus including two or more of such means claimed in combination.
- (2) Note. Complete the search in this class, subclass 166, where there is gravity feed from one trough or tube to another.
- SEE OR SEARCH CLASS:
159, Concentrating Evaporators, sub-classes 17+.
- 181 With gas or vapor flow for contact with treated material:**
This subclass is indented under subclass 179. Apparatus including means to contact the material undergoing treatment with a gas or vapor.
- SEE OR SEARCH CLASS:
432, Heating, subclass 139 for a heater in which material is moved or agitated in a stationary receptacle to which combustion products are fed from a combustion products generator.
- 182 Axial treated material feed type:**
This subclass is indented under subclass 181. Apparatus in which the material is introduced at one end, moves in the direction of the receptacle or tube axis, and is discharged at the other end.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
166 and 183.
- 183 Axial treated material feed type:**
This subclass is indented under subclass 179. Apparatus having material feed of the type defined in subclass 182.
- (1) Note. Complete the search in this class, subclasses 166 and 182.
- 184 Rotary or swinging carrier or rack:**
This subclass is indented under the class definition. Apparatus including means for carrying material and moving about an axis, and not provided for above.
- (1) Note. Search rotary drums or receptacles, particularly subclass 109, for a hollow rotary member provided with compartments or material supporting means even though such means are removable or detachable.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
59 and 165+, particularly subclasses 171+ for means for including rotary members such as shelves where the material is caused by gravity to pass from shelf to shelf, and subclass 147, where the material moves spirally.
103, for rotary members carrying forms.
150 and 163, and Classes 108, Horizontally Supported Planar Surfaces, sub-classes 20+ and 39; 198, Conveyors: Power-Driven, subclasses 608, 611+, 803.16, and others; 211, Supports: Racks, subclasses 1.5 and 163+ and 312, Supports: Cabinet Structure, sub-classes 125, 135, 252, 266, 267, and 305.
162 and 163, for rotary carriers peculiar to sheet, web or strand material.
207 and 208, for conveyors moving in a rectilinear or irregular plural path which may have material supporting members mounted on pivots.
- 185 With agitating means or discharging scrapers:**
This subclass is indented under subclass 184. Apparatus having either, or both (1) agitating means, or (2) a scraper to cause discharge of the material undergoing treatment.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
85, for cleaning means.
173 and 178, for gravity material flow type.

186 Plural rotary or swinging units:
This subclass is indented under subclass 184. Apparatus including a plurality of separately movable carrier or rack units. The units may themselves be mounted on a rotary member.

(1) Note. Plural support elements mounted for motion together as a single unit are not included in this subclass, being classified in subclass 184 or the subclasses below.

(2) Note. See (4) Note to subclass 209 of this class for other subclasses involving plural units or compartments.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 608, 624 and others for plural rotating conveyors.

187 With gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 184. Apparatus provided with means for causing a flow of treating gas or vapor into contact with the material treated.

188 Air scoops and/or suspended treated material supports:

This subclass is indented under subclass 187. Apparatus (1) provided with a member projecting from the rotary member, usually a curved plate, and acting to force a flow of gas or vapor over the material treated, or (2) in which the material supports are suspended from the carrier as in a Ferris wheel, or both (1) and (2).

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 797+ for a load elevating platform which remains level as it moves on an orbital path.

189 Elevator type:

This subclass is indented under the class definition. Apparatus including mechanism acting to elevate or lower material by gripping the material or supporting removable material carriers, such as trays, so that the carriers may be elevated or lowered during treatment or the mechanism may be used to load or unload the apparatus, plus positive means to treat the

material. The trays or supports usually move vertically and in superimposed relation.

(1) Note. See this class, subclass 612 for elevator apparatus restricted to handling or treating sheet material. If sheets are carried on trays adapted to carry other material and the apparatus is not otherwise peculiar to sheet handling, the patents are classified here.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94, and notes thereunder, for apparatus which may raise or lower stacks of sheets.

147, for devices moving material spirally.

165+, where the material moves at least partially by gravity, i.e., falls freely through space.

194, and notes, for means for loading containers on fixed floors, shelves or guides.

203+, for devices feeding material from one conveyor to another at different levels.

SEE OR SEARCH CLASS:

198, Conveyors: Power Driven, subclass 346.1 and appropriate indented subclasses, 465.1, 604+, 625, 626+, 663, and 793+.

414, Material or Article Handling, subclasses 788+, 564, 589, and 591.

190 Plural:

This subclass is indented under subclass 189. Apparatus in which the material supports are carried in two or more elevator columns.

191 Reversible or pulsating treating gas or vapor flow:

This subclass is indented under the class definition. Apparatus having either, or both, (1) means to cause the contact gas or vapor to pulsate, or (2) means to cause the contact gas or vapor to flow into contact with the material being treated first in one direction and then in an opposite direction at the same place.

(1) Note. This subclass does not include those apparatuses in which the treating gas or vapor flows in reverse directions in different places, for which see this

class, subclasses 203+, 210 and other subclasses, particularly subclasses 223, 224, 225, 226, 230, and 232.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 92, 402+, and 558+, for sub- or superatmospheric treatment including varying such pressures.
- 222 and 229, for movable gas distributors.
- 463+, and notes, for processes involving gas or vapor flow directing or control.
- 562+, for such means combined with timing means, and subclass 54 for automatic control of the flow of treating gas or vapor.

SEE OR SEARCH CLASS:

- 417, Pumps, subclass 315 for reversible flow pumps.

192 Removable shelf or tray type:

This subclass is indented under the class definition. Apparatus in which an enclosure or supporting means has means providing for the insertion or removal of shelves, trays or drawers from the enclosure or supporting means.

- (1) Note. Such means may be, for example, guides or supporting surfaces.
- (2) Note. Complete the search in this class, subclasses 237+, and see notes, for container, drawer, tray, shelf, or floor structure where the shelf, tray or drawer supporting or enclosing means are not claimed, or for heated drying floors or surfaces, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 94, where sheets are spaced by loose spacer sheet or web even though supported by shelves or trays.
- 143+, for press type where the supporting members are opposed and exert a pressing action.
- 148+, for removable shelf or tray type apparatus restricted to handling sheet material, particularly subclass 163.
- 149, 189, and 190, for elevator type for shelves.
- 165+, where the material goes from one level to another by gravity.

184+, for rotary carriers which may include removable shelves or trays.

201+, particularly subclass 211 for houses, kilns and containers, including superposed floors, shelves or chambers, where an arrangement for removable insertion of shelves, trays, or drawers is not claimed.

SEE OR SEARCH CLASS:

- 165, Heat Exchange, subclasses 78 and 120.
- 312, Supports: Cabinet Structure, subclasses 293 and 294+, for cabinets having movable and removable components.

193 Plural nonvertically aligned:

This subclass is indented under subclass 192. Apparatus in which two or more of the removable shelf, tray or drawer elements are arranged in other than vertical alignment.

194 With shelf or tray handling means:

This subclass is indented under subclass 192. Apparatus including means for handling the trays or shelves except mere guides on which the shelves or trays are supported.

- (1) Note. Such means may be trucks on which the trays or shelves are removably mounted, or other mechanical means operating to insert or remove the same, but see and search subclass 201, particularly subclasses 204, 207, 208, 215+, 216, 217, 227, and 228, for apparatus including tray handling means, such as trucks, or conveyors, but no means providing for the insertion or removal of shelves, trays or drawers are claimed.
- (2) Note. For dumping shelves in shaft type, see this class, subclasses 172 and 178.

195 With gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 192. Apparatus including means to contact the material treated with a treating gas or vapor.

- (1) Note. Complete the search for the subject matter provided for in this subclass in subclasses 193 and 194. Subject matter for the indented subclasses below is

cross-referenced from subclasses 193 and 194.

SEE OR SEARCH CLASS:

432, Heating, subclass 162 for a heating chamber in which combustion products contact work material supported on a shelf, rack, or tray on a guide or pivot and subclass 204 for a work chamber in which heated air traverses material held on a separable tray where the air is heated by a specific combustion type heating means.

196 Recirculation of treating gas or vapor:

This subclass is indented under subclass 195. Apparatus including means to recirculate the treating gas or vapor in whole or part.

- (1) Note. See (1) Note to subclass 219 of this class, for search for gas or vapor recirculation.

197 With heater:

This subclass is indented under subclass 195. Apparatus including heating means for either, or both, (1) the treating gas or vapor, or (2) the material treated.

198 With liquid heater or vaporizer:

This subclass is indented under subclass 197. Apparatus having a liquid heater or vaporizer for supplying a heat exchange heater.

- (1) Note. See (2) and (3) Notes to subclass 192 of this class.

199 Zigzag treating gas or vapor flow:

This subclass is indented under subclass 195. Apparatus in which the treating gas or vapor flows in a back-and-forth path.

SEE OR SEARCH THIS CLASS, SUBCLASS:
226, and see notes.

200 With liquid heater or vaporizer:

This subclass is indented under subclass 192. Apparatus having a liquid heater as defined in subclass 198.

- (1) Note. See (2) and (3) Notes to subclass 192 of this class.

201 Houses, kilns, and containers:

This subclass is indented under the class definition. Apparatus including an enclosure which may be open on one side (including the top side).

- (1) Note. See this class, apparatus subclass 92 and notes, for vacuum drying.
- (2) Note. For other enclosures which are or may be used for treating material, see classes in the search notes below referencing this (2) Note.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 88, for enclosures with display, inspecting or illuminating means, and see notes.
- 192+, for removable shelf or tray type.
- 237 and 238, for floors or trays on which material is piled but having no means other than a mere surrounding flange to enclose the same. Such devices are not in this group unless combined with additional means such as covers or walls to enclose the material.
- 242, for material entrance seals including enough house, kiln or container structure to cooperate with a seal, including those seals in the form of a material transfer chamber.

SEE OR SEARCH CLASS:

- 4, Baths, Closets, Sinks, and Spittoons, subclasses 111.1+ and 524+. (See (2) Note above).
- 8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 147+. (See (2) Note above).
- 19, Textiles: Fiber Preparation, subclass 66. (See (2) Note above).
- 26, Textiles: Cloth Finishing, subclasses 3, 51, and 71+, and their indented subclasses. (See (2) Note above).
- 44, Fuel and Related Composition, subclasses 630+. (See (2) Note above).
- 47, Plant Husbandry, subclasses 1.01 and 17. (See (2) Note above).
- 48, Gas: Heating and Illuminating, subclasses 62, 89, and 119 and their indented subclasses, 173 and 174+. (See (2) Note above).

- 52, Static Structures (e.g., Buildings), appropriate subclasses. (See (2) Note above).
- 62, Refrigeration, appropriate subclasses. (See (2) Note above).
- 65, Glass Manufacturing, appropriate subclasses, especially subclasses 349+ for glass annealing or tempering furnaces. (See (2) Note above).
- 68, Textiles: Fluid Treating Apparatus, particularly subclasses 5+, 18, and 20. (See (2) Note above).
- 71, Chemistry: Fertilizers, subclasses 64.01+. (See (2) Note above).
- 72, Metal Deforming, appropriate subclasses. (See (2) Note above).
- 99, Foods and Beverages: Apparatus, subclass 451. (See (2) Note above).
- 110, Furnaces, subclasses 235+. (See (2) Note above).
- 119, Animal Husbandry, subclasses 302+ and 311+. (See (2) Note above).
- 126, Stoves and Furnaces, appropriate subclasses. (See (2) Note above).
- 131, Tobacco, subclasses 300+. (See (2) Note above).
- 134, Cleaning and Liquid Contact With Solids, (see (2) Note above).
- 159, Concentrating Evaporators, subclasses 17+ and 22+. (See (2) Note above).
- 164, Metal Founding, appropriate subclasses. (See (2) Note above).
- 165, Heat Exchange, subclasses 72+ for a heat exchanger with a removable cover for an access opening, and subclass 169 for an enclosure formed by tempering wall means. (See (2) Note above).
- 198, Conveyors: Power-Driven, subclasses 861.1+. (See (2) Note above).
- 202, Distillation: Apparatus, appropriate subclasses for kilns. (See (2) Note above).
- 237, Heating Systems, appropriate subclasses; see particularly subclasses 48 and 53 for tobacco barns where the tobacco holding or handling means are not claimed. (See (2) Note above).
- 266, Metallurgical Apparatus, subclasses 168+, for apparatus for treating an ore by contacting it with a gas while there is contained in an enclosure and sub-
- classes 250+, for means for contacting a solid metal object with a gas while the object is enclosed in a housing. (See (2) Note above).
- 312, Supports: Cabinet Structure, subclass 213, for ventilated wall cabinets, and subclass 236, for cabinets with heat exchange means. (See (2) Note above).
- 356, Optics: Measuring and Testing, subclasses 36+ for the preparation of a material for an optical test. (See (2) Note above).
- 373, Industrial Electric Heating Furnaces, appropriate subclasses. (See (2) Note above).
- 396, Photography, subclasses 564+ for photographic fluid-treating which may include drying. (See (2) Note above).
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, appropriate subclasses. (See (2) Note above).
- 432, Heating, subclasses 120+, for a residual work chamber having heating means. (See (2) Note above).
- 435, Chemistry: Molecular Biology and Microbiology, subclasses 283+ and 291+. (See (2) Note above).
- 454, Ventilation, for the ventilation subcombination, particularly subclasses 173+, for ventilated storage chambers. (See (2) Note above).
- 607, Surgery: Light, Thermal, and Electrical Application, subclasses 1+, particularly subclasses 81+. (See (2) Note above).
- 202 Article inserted type:**
This subclass is indented under subclass 201. Apparatus including structure forming an enclosure having one or more openings or an open front through which an article is partially inserted to project into the enclosure and be treated as by a gas or vapor or by heat. Many of these patents are devices for treating the toes or soles of shoes.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
104, and indented subclasses, for apparatus restricted to hollow article drying.

SEE OR SEARCH CLASS:

12, Boot and Shoe Making, subclass 1, and see the reference to Class 12 in the main class definition, (2) Note, of this class.

203 With conveyors providing plural or zigzag treated material paths:

This subclass is indented under subclass 201. Apparatus including conveyors for transporting material in plural or zigzag paths.

- (1) Note. The above definition excludes the mere handling of material as by supports, trucks, tracks, or trays where no mechanical means are provided for causing the material to be conveyed while within the house, kiln or container.
- (2) Note. Complete the search in this class, subclasses 646, 647, and 657, which include plural run conveyors peculiar to the handling of sheets, webs or strands.
- (3) Note. For other houses, kilns or containers having conveyors, see appropriate preceding subclasses, particularly subclasses 105, 108+, 147, 576+, 611+, particularly subclasses 647+, 657+, and 658+, 164, 179+, 189, and 190.
- (4) Note. For houses, kilns or containers having a single conveyor for conveying material in a single path, see this class, subclasses 201+ and other appropriate indented subclass, and subclasses 216 and 217, for plural units or compartments having handling means such as trucks and rails for moving material in single or plural paths.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

481 and 482+, for processes involving material speed, thickness or quantity control.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, appropriate subclasses for systems of plural conveyors, and subclasses 599 and 603 for plural conveyors forming an ascending or descending zigzag path.

204 Separable truck or tray:

This subclass is indented under subclass 203. Apparatus in which the conveyor has provision for carrying or moving material supports which are detachable therefrom.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

194, for other shelf, tray or drawer handling, and see notes to subclasses 192+.

SEE OR SEARCH CLASS:

104, Railways, appropriate subclasses, such as 172.1+, 173.1+ and 202+.

205 Plural independent paths for treated material:

This subclass is indented under subclass 203. Apparatus in which the material travels in two or more independent paths.

- (1) Note. For means feeding material through plural press couples in independent paths, see this class, subclass 144.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclass 570 for plural conveyors providing independent conveying paths.

206 Pusher type:

This subclass is indented under subclass 203. Apparatus including means contacting the material and moving it by pushing along a support, as by reciprocating or continuously moving blades.

- (1) Note. This subclass includes devices which may both carry and push the material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

208, for single endless conveyors, both courses carrying but neither pushing, material.

SEE OR SEARCH CLASS:

198, Conveyors: Power-Driven, subclasses 717+.

207 Plural run endless conveyor:

This subclass is indented under subclass 203. Apparatus including an endless conveyor having portions thereof extending in different directions, and which thus carries the material to be treated in an irregular (generally zigzag) path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

208, for two course endless conveyors, both courses carrying material.

208 Single run endless, both courses carrying treated material:

This subclass is indented under subclass 203. Apparatus including a single endless conveyors traveling in a closed two course circuit with both courses of the conveyor carrying material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

206, for single endless conveyors in which one course may carry and the other course push material.

209 Plural treating units or compartments:

This subclass is indented under subclass 201. Apparatus including either, or both, (1) two or more houses, kilns or containers, or (2) an enclosure divided into a plurality of material treating compartments, as by partitions.

(1) Note. The following subclasses in this class involve plural units or compartments: 61, 62 and indented subclasses, 68, 98, 113 and indented subclasses, 127 and indented subclasses, 144, 167, 180, 186, 190, and 193.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

192, and indented subclasses, for removable shelf or tray type.

203, and indented subclasses for subject matter provided for in this subclass or the indented subclasses, plus conveyors providing plural treating units or compartments.

226, where baffles or deflectors not forming distinct material compartments cause a tortuous gas flow.

238, for plural tray units.

210 With gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 209. Apparatus including means to contact the material treated with a treating gas or vapor.

211 Superposed floors or chambers:

This subclass is indented under subclass 210. Apparatus in which two or more of the treating units or compartments are vertically arranged with respect to each other.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

171, and indented subclasses, and subclass 178 for gravity material flow type.

192, and indented subclasses, for vertically arranged removable shelf or tray type and subclasses 237 and 238, for vertically arranged trays or floors.

212 Recirculation of treating gas or vapor:

This subclass is indented under subclass 210. Apparatus including means to recirculate the treating gas or vapor in whole or part.

(1) Note. See (1) Note to subclasses 219+, this class, for other gas or vapor recirculation.

(2) Note. This subclass does not include the reuse of the gas or vapor in successive compartments or units without recirculation through each or through two or more.

213 Parallel circulation only:

This subclass is indented under subclass 212. Apparatus in which each separate unit or compartment has a gas or vapor recirculation path individual to it.

(1) Note. The flow may be caused by a single gas or vapor forcing means but where there are two or more separate recirculation paths and any one thereof includes two or more units or compartments, see this class, subclasses 212+.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

214, for parallel circulation only, not involving recirculation.

214 Parallel circulation only:

This subclass is indented under subclass 210. Apparatus in which each separate unit or compartment has a gas or vapor path individual to it.

- (1) Note. Where there are two or more gas or vapor paths and any one thereof includes two or more units or compartments, see this class, subclass 210 or other appropriate indented subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

213, for parallel circulation involving recirculation.

215 With heater:

This subclass is indented under subclass 210. Apparatus including heating means for either, or both, (1) the treating gas or vapor, or (2) the material undergoing treatment.

SEE OR SEARCH THIS CLASS, SUBCLASS:

209, for heaters without gas or vapor contact means.

216 With conveyor and/or movable treated material support:

This subclass is indented under subclass 215. Apparatus having either, or both, (1) a conveyor for conveying the material undergoing treatment into and out of the unit or compartment, or (2) a support for the material undergoing treatment (such as a rack or car) movable into and out of the unit or compartment.

217 With conveyor and/or movable treated material support:

This subclass is indented under subclass 210. Apparatus having means as defined in subclass 216.

218 With gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 201. Apparatus including means to contact the material undergoing treatment with a gas or vapor.

SEE OR SEARCH CLASS:

432, Heating, subclasses 201+ for a work chamber supporting work to be traversed by a stream of air heated indirectly by a specific combustion device.

219 Recirculation of treating gas or vapor:

This subclass is indented under subclass 218. Apparatus including means to recirculate the treating gas or vapor in whole or part.

- (1) Note. The following apparatus subclasses include recirculation of the treating gas or vapor: 565+, 576+, 77, 78, 84, 100, 114, 115, 122, 131, 629+, and indented subclasses, 169, 181, 182, 187+, 191, 196, 212, and 213.

220 Caused by heater action only:

This subclass is indented under subclass 219. Apparatus in which the recirculation is caused by the heater only.

SEE OR SEARCH THIS CLASS, SUBCLASS:

78,
234, for gas or vapor flow caused by heater action, without recirculation.

221 Caused by jet action:

This subclass is indented under subclass 219. Apparatus in which the treating gas or vapor is caused to recirculate by the jet action (Venture or aspirating effect) caused by injection or flow of treating gases or vapors into the treating chamber.

- (1) Note. Complete the search in this class, subclass 84 for jet devices which add a treating material to the treating gas or vapor and cause circulation thereof, and subclass 75 for direct contact condensers.

222 Movable gas or vapor distributor:

This subclass is indented under subclass 219. Apparatus in which, (1) the means for delivering or distributing the treating gas or vapor to the treating chamber is mounted for motion, or (2) the gas or vapor forcing means is mounted for motion in addition to the motion necessary to force the gas or vapor.

- (1) Note. Such motion may be for either (1) changing the direction of gas or vapor flow, or (2) for removal from the treating chamber of the delivering or distributing means or the forcing means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

229, and notes thereto.

223 Plural gas or vapor forcing means:

This subclass is indented under subclass 219. Apparatus including more than one means for forcing the flow of the treating gas or vapor.

- (1) Note. Complete the search in this class, subclasses 191, 203 and indented subclasses, particularly subclass 207, and subclasses 212, 213, 226, and 230 and see notes thereto. Subclass 191 includes plural reversible blowers or plural blowers with means for causing a reverse flow.

224 Plural gas or vapor inlets and/or outlets:

This subclass is indented under subclass 219. Apparatus including two or more inlets and/or two or more outlets for the treating gas or vapor to the material treating chamber. This is usually to obtain a desired distribution of the treating gas or vapor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

203, and indented subclasses, and 220-223, for the subjects matter there provided for which may include plural inlets and/or outlets.

232+,

225 In wall, ceiling, or floor:

This subclass is indented under subclass 224. Apparatus in which one or more of the partitions forming the material treating chamber are provided with plural openings.

- (1) Note. This includes foraminous walls, such as walls formed of slats or pervious fabrics.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

233,

226 Tortuous gas or vapor path:

This subclass is indented under subclass 218. Apparatus having means for causing the treating gas or vapor to move through the treating chamber in other than a rectilinear path (as a spiral, helical or zigzag path).

- (1) Note. Complete the search on tortuous treating gas or vapor path in this class, subclasses 199, 203 and 209 and their indented subclasses, particularly subclasses 212, 215 through 217 and 223. In subclass 209 and indented subclasses the flow is through distinct material compartments.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

229, 230, and 231.

227 Gas or vapor flow toward or from treated material entrance or exit:

This subclass is indented under subclass 218. Apparatus in which the treating gas or vapor flows through the treating chamber (1) from either the treated material entrance or exit toward opposite end, or (2) is introduced at some intermediate point and flows toward either the treated material entrance or exit, or (3) both.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

209, and indented subclasses, particularly subclasses 215 through 217 and 226 and in subclass 203 and indented subclasses.

228 Countercurrent to treated material motion only:

This subclass is indented under subclass 227. Apparatus in which the gas and/or vapors that contact the material have opposite directions of flow only.

229 Movable gas or vapor distributor:

This subclass is indented under subclass 218. Apparatus having a movable gas or vapor distributor as defined in subclass 222.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 191, for means for causing reversible or pulsating flow.
- 226, for baffles causing a tortuous flow.
- 231, for fixed gas or vapor baffles and see notes thereto.

230 Plural gas or vapor forcing means:

This subclass is indented under subclass 218. Apparatus having plural gas or vapor forcing means as defined in subclass 223.

- (1) Note. Complete the search in this class, subclasses 212 through 214, 223, and 226 and see notes thereto.

231 Deflecting baffle in treating chamber:

This subclass is indented under subclass 218. Apparatus including one or more baffles for guiding the treating gas or vapor in a definite path through the treating chamber.

- (1) Note. Where baffles cause a recirculation, see this class, subclass 219 and indented subclasses.
- (2) Note. Complete the search in this class, subclass 226, where the baffles cause a tortuous gas or vapor flow; in subclass 209 and indented subclasses, where partitions forming units or compartments act as baffles; in subclasses 222 and 229, for movable baffles, and in subclass 203 and indented subclasses, for baffles between conveyors or conveyor runs.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 195, and indented subclasses, for baffles causing a desired flow of the treating gas and/or vapor over removable shelves or trays.
- 232 and 233, for ducts, openings, etc., for introducing the treating gas or vapor into or removing it from the treating chamber.

232 Plural gas or vapor inlets and/or outlets:

This subclass is indented under subclass 218. Apparatus having two or more gas or vapor inlets and/or outlets as defined in subclass 224.

SEE OR SEARCH CLASS:

- 454, Ventilation, particularly subclass 173 and indented subclasses.

233 In wall, ceiling, or floor:

This subclass is indented under subclass 232. Apparatus having openings in the wall, ceiling or floor as defined in subclass 225.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 174 and 211, for superposed floors many of which are perforated.

234 Caused by heater only:

This subclass is indented under subclass 218. Apparatus in which the flow of treating gas or vapor into contact with the material is caused by the heater alone.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 73, 74, 75, 197, and 198.
- 220, for recirculation caused by heater action, and search notes thereto.
- 235, where the heater causes the evolved gases or vapors to vent.

235 With venting means:

This subclass is indented under subclass 201. Apparatus including means to vent the gases or vapors evolved due to treatment of the material.

- (1) Note. For means to vent gases and/or vapors which contact material for treatment, see this class, subclasses 210 and 218 and their indented subclasses.
- (2) Note. See process subclass 521 and apparatus subclass 72 and indented subclasses of this class for means to treat the treating gas or vapors or the evolved gases or vapors, and subclass 92 for vacuum apparatus.

236 Treated material handling or conveying:

This subclass is indented under the class definition. Apparatus comprising material handling means or material conveying means combined with means to dry and/or contact the material being treated with a treating gas or vapor.

- (1) Note. See appropriate subclasses of this class for the apparatus here defined combined with other apparatus, and complete the search in subclass 162 for means peculiar to sheet, web or strand, and subclass 71 for absorbent conveyors combined with other drying means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

576+, for fluid current conveyors.

SEE OR SEARCH CLASS:

193, Conveyors, Chutes, Skids, Guides, and Ways, for pertinent subclass(es) as determined by schedule review.

198, Conveyors: Power-Driven, for pertinent subclass(es) as determined by schedule review.

237 **Trays or floors:**

This subclass is indented under the class definition. Apparatus including supporting surfaces upon which material is placed. These may include a mere surrounding flange.

- (1) Note. Complete the search in this class, subclass 192 and indented subclasses, particularly subclasses 197, 198 and 200. These subclasses must be searched for housings or supports as well as for the subject provided for in this and the indented subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

172 and 178, for plural floors with gravity flow therebetween.

225 and 233, and see notes.

239 and 240.

SEE OR SEARCH CLASS:

52, Static Structures (e.g., Buildings), subclasses 660+ for fabric or lattice openwork, e.g., gratings, not elsewhere provided for.

209, Classifying, Separating, and Assorting Solids, subclasses 392+ for sifting element dress.

210, Liquid Purification or Separation, subclasses 498 and 499 for filter plates or screens.

- 432, Heating, subclasses 253+, for a means specialized to holding, shielding, or supporting work within a furnace.

238 **Single or plural trays only:**

This subclass is indented under subclass 37. Apparatus including the structure of single trays and combinations of two or more tray structures.

- (1) Note. Subclass 237 of this class has such devices combined with either, or both, (1) heating means, or (2) gas or vapor forcing means.

- (2) Note. Search various receptacle classes, such as Classes 217, Wooden Receptacles, 220, Receptacles, and 229, Envelopes, Wrappers, and Paperboard Boxes, for other tray structure.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

201+, particularly subclass 233 for receptacle structure.

239 **Supports:**

This subclass is indented under the class definition. Apparatus including means to support the material treated and not provided for above.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

101 and 106.

143+, for platens in press type driers.

237 and 238.

SEE OR SEARCH CLASS:

211, Supports: Racks, and 248, Supports, for supports not combined with drying and/or gas or vapor contact means.

269, Work Holders, appropriate subclasses. Class 269 is the residual locus for patents to a device for clamping, supporting and/or holding an article (or articles) in position to be operated on or treated. See notes thereunder for other related loci.

240 **Rods or rolls:**

This subclass is indented under subclass 239. Apparatus restricted to the structure of supporting rods or rolls, per se.

- (1) Note. For external drying drums, see this class, subclasses 110+.

SEE OR SEARCH CLASS:

- 294, Handling: Hand and Hoist-Line Implements, subclasses 5.5, 19.1+, and particularly, subclass 243.5 for supporting rods used in handling.
 452, Butchering, subclasses 187+ for supports used in butchering.
 492, Roll or Roller, for a roll, per se, not elsewhere provided for, and see the notes thereunder.

241 Gas or vapor distributing and applying agitators:

This subclass is indented under the class definition. Apparatus including an agitator for material in combination with means for delivering a gas or vapor for contact with such material.

- (1) Note. Where such means is claimed in combination with the treated material supporting means, see the appropriate group above.

242 Chamber seals:

This subclass is indented under the class definition. Apparatus including means to seal an opening in a treating chamber against gas or vapor leakage inwardly or outwardly and providing for the feeding of material through the opening.

- (1) Note. This subclass includes only enough of the chamber structure to cooperate with the seal. Where other housing or treating is claimed, the patents are elsewhere appropriately classified. This applies to a chamber acting as a seal or air lock only. For other plural chambers or compartments which may have seals therebetween, see this class, subclasses 209+.
- (2) Note. See this class, subclass 231 and notes for deflecting baffles causing a definite gas or vapor flow.
- (3) Note. Complete the search in this class, subclass 92 and see notes. Such subclass includes vacuum treating chambers including feeders and chamber seals.

SEE OR SEARCH CLASS:

- 198, Conveyors: Power-Driven, subclasses 860.3+.
- 202, Distillation: Apparatus, subclass 269.
- 221, Article Dispensing, subclasses 106 and 108, for rotary trap chamber feeders.
- 277, Seal for a Joint or Juncture, for a generic sealing means or process.
- 396, Photography, subclass 579 for the use of a gaseous fluid treating apparatus in photography.
- 414, Material or Article Handling, subclasses 217+ for apparatus for moving material between zones having different pressures and inhibiting a change in the pressure gradient there between.
- 432, Heating, subclass 242, for a closure or seal for the work entrance passage of a heating furnace.
- 454, Ventilation, subclasses 188+ for the use of a protective air current which seals an opening against gas or vapor leakage therethrough.

245 MATERIAL TREATED BY ELECTROMAGNETIC ENERGY:

This subclass is indented under the class definition. Subject matter in which a physical substance or object is subjected to electrical power or radiation extending across the entire range of frequencies from 10^{23} cycles per second to 0 cycles per second or corresponding wavelengths from 10^{-13} cm to infinity to remove moisture from the substance or object.

- (1) Note. Where the energy is not applied to the object or material, but is used for generating heat energy that is transferred to the material or object, see other subclasses of this class or other appropriate heating classes.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclass 451 for apparatus for directing an electric current, field, or discharge through food.
- 131, Tobacco, subclass 299 for a process of drying tobacco in which electrical energy is applied to the tobacco.

- 204, Chemistry: Electrical and Wave Energy, appropriate subclasses for electrical or wave energy processes, especially subclasses 450+ for drying solids by electro-osmosis or electrophoresis, subclasses 155+ for chemical production of a compound or element by electrical or wave energy in a magnetic field, and subclasses 164+ for chemical treatment of a compound or element by an electrostatic field or electrical discharge.
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, for drying by electrolysis, especially subclasses 687+.
- 315, Electric Lamp and Discharge Devices: Systems, for miscellaneous systems supplying electric energy to an electric space discharge device of the gas or vapor ionization type.
- 373, Industrial Electric Heating Furnaces, and Class 219, Electric Heating, for a process and apparatus for applying electrical energy to material or an object for heating only.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 20, 21, and 22+ for process of disinfecting, deodorizing, preserving, or sterilizing by electrical or wave energy.
- 426, Food or Edible Material: Processes, Compositions, and Products, subclasses 237+ for a process involving the application of electrical or wave energy to foods.
- 246 Electric current applied directly through material:**
This subclass is indented under subclass 245. Subject matter wherein a flow of electric charge is carried through the material as if the material itself were an electrical conductor.
- 247 Induction heater:**
This subclass is indented under subclass 245. Subject matter wherein the electrical energy creates heat by generating an electromotive force through the use of a varying magnetic flux.
- 248 Magnetic field:**
This subclass is indented under subclass 245. Subject matter wherein the material is subjected to a magnetic field.
- 249 Controls particle movement in a fluidized bed:**
This subclass is indented under subclass 248. Subject matter wherein the magnetic field regulates the motion of small pieces of material suspended in a gas stream.
- 250 Electrostatic field:**
This subclass is indented under subclass 245. Subject matter wherein the electromagnetic energy is in the form of a stationary electric field.
- 251 Having suction means:**
This subclass is indented under subclass 250. Subject matter including means to create a reduced pressure around the material being treated.
- 252 Having vibration means:**
This subclass is indented under subclass 250. Subject matter including means to rapidly oscillate the material.
- 253 Having needlelike electrodes:**
This subclass is indented under subclass 250. Subject matter including thin pointed electric conductors to emit an electrostatic field.
- 254 Having heating or cooling means:**
This subclass is indented under subclass 250. Subject matter including means to vary the temperature of the material, a treating gas or vapor, or other parts of a drying system.
- 255 Radio or high-frequency energy:**
This subclass is indented under subclass 245. Subject matter wherein the radiation used in drying is approximately 10^7 - 10^8 Hz with a corresponding wavelength of 10^4 - 10^2 cm.
- 256 Having additional heating means:**
This subclass is indented under subclass 255. Subject matter including a separate means to increase the temperature of the material, a treating gas or vapor, or other parts of a drying system.

- 257 Having pressure reducing means:**
This subclass is indented under subclass 255. Subject matter including means to establish a vacuum or a suction.
- 258 Plural units or chambers:**
This subclass is indented under subclass 255. Subject matter including more than one high-frequency device or multiple compartments.
- 259 Microwave energy:**
This subclass is indented under subclass 245. Subject matter wherein the radiation used in drying is approximately 10^{10} Hz with a corresponding wavelength of 1.0 cm.
- 260 Clothes dryer:**
This subclass is indented under subclass 259. Subject matter wherein the microwave dryer is used for removing moisture from articles of apparel.
- 261 Having rotating drum:**
This subclass is indented under subclass 260. Subject matter wherein the microwave clothes dryer has a cylindrical chamber which turns about the cylinder axis.
- 262 Having vibrating means:**
This subclass is indented under subclass 259. Subject matter including means to rapidly oscillate the material.
- 263 Having pressure reducing means:**
This subclass is indented under subclass 259. Subject matter including means to establish a vacuum or suction.
- 264 Plural units or chambers:**
This subclass is indented under subclass 259. Subject matter including more than one microwave device or multiple compartments.
- 265 Having treating gas or vapor circulation:**
This subclass is indented under subclass 259. Subject matter including means to distribute gas or vapor through the dryer.
- 266 Infrared energy:**
This subclass is indented under subclass 245. Subject matter wherein the radiation used in drying is in the frequency range of 10^{13} - 10^{14} Hz with a corresponding wavelength of 10^{-3} cm.
- 267 Having treating gas or vapor circulation:**
This subclass is indented under subclass 266. Subject matter wherein gas or vapor is distributed in the same treating area as that treated by the infrared radiation.
- 268 Radiation controlled by other drying parameters:**
This subclass is indented under subclass 266. Subject matter wherein the infrared radiator output is regulated by sensed drying conditions such as moisture content of the treated material, temperature of the treated material, speed and quantity of the treated material, moisture content of the treating gas, etc.
- 269 Having temperature control:**
This subclass is indented under subclass 268. Subject matter wherein the temperature of the material, the temperature of the treating gas, or the temperature of the treating chamber is varied or regulated.
- 270 Vehicle paint dryer:**
This subclass is indented under subclass 266. Subject matter wherein infrared radiation alone is applied to a vehicle for the purpose of drying or curing a painted vehicle surface.
- 271 Including evolved gas or vapor treatment:**
This subclass is indented under subclass 270. Subject matter in which gas or vapor emitted due to heating is condensed or otherwise treated.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
467, for a process of treating the contacting gas or vapor.
- 272 Including vehicle conveyor:**
This subclass is indented under subclass 270. Subject matter wherein the vehicle being treated is transported through the treating zone.
- (1) Note. Should gas or vapor circulation occur in a process wherein the gas circulation and infrared treatment are not applied in the same treatment location then these patents should be properly

- placed in subclass 418 for diverse types of drying operations.
- 273 Sheets, webs, or strands:**
This subclass is indented under subclass 266. Subject matter wherein the treated material is a broad, thin, rectangular piece, a mesh, or cords.
- 274 Having gas or vapor treatment:**
This subclass is indented under subclass 273. Subject matter wherein the gas or vapor is handled in some manner.
- 275 Ultraviolet energy:**
This subclass is indented under subclass 245. Subject matter wherein the radiation used in drying is approximately 10^{16} Hz with a corresponding wavelength of 10^{-5} - 10^{-6} cm.
- 276 Inert gas atmosphere:**
This subclass is indented under subclass 275. Subject matter wherein a dryer has a nonreactive gas environment.
- 277 Having shutter means:**
This subclass is indented under subclass 275. Subject matter wherein a movable cover is positioned between the material and ultraviolet radiation source.
- 278 With cooling means:**
This subclass is indented under subclass 275. Subject matter including means to remove heat.
- 279 MATERIAL TREATED BY ACOUSTIC ENERGY:**
This subclass is indented under the class definition. Subject matter in which a physical substance or object is subjected to sound waves.
- 280 FEATHER TREATING:**
This subclass is indented under the class definition. Subject matter disclosed for processing bird plumage.
- SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 404 and 94.1+. For the line between Class 8, subclasses 94.1+, and this subclass, see (3) Note in that subclass.
- 15, Brushing, Scrubbing, and General Cleaning, appropriate subclasses.
- 19, Textiles: Fiber Preparation, subclass 4.
- 71, Chemistry: Fertilizers, subclass 18.
- 141, Fluent Material Handling, With Receiver or Receiver Coating Means, appropriate subclasses for filling a mattress or the like with fluent material wherein the material is handled as fluid material.
- 209, Classifying, Separating, and Assorting Solids, particularly subclasses 2 and 133+.
- 223, Apparel Apparatus, subclass 47.
- 422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 1 through 143.
- 281 With agitator:**
This subclass is indented under subclass 280. Subject matter including means to stir, beat, or shake the feathers being treated.
- 282 PROCESS:**
This subclass is indented under the class definition. Method.
- 283 Hair on head:**
This subclass is indented under subclass 282. Process for treating human hair while on the head.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
96+, and see the notes to indented subclasses for apparatus to dry human hair while on the head.
- 284 Freeze-drying:**
This subclass is indented under subclass 282. Process of drying a treated material by cooling by evaporating moisture contained within the material to produce a frozen mass and then applying a means to remove or decrease the amount of moisture in the treated material.
- (1) Note. Freezing by application of a vacuum plus other treating is in this subclass; for other vacuum treating see subclasses 406+.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 391, for combined drying or cooling not involving freezing, and subclass 428 for cooling by gas or vapor contact.
- SEE OR SEARCH CLASS:
 62, Refrigeration, subclasses 532+ and 123+ for separating liquids by freezing.
 264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 5+ for a method for comminuting liquids into particulate solid material which may include freezing with or without drying of cooling fluid.
 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.
- 285 With separating of frozen fluid from treated material:**
 This subclass is indented under subclass 284. Process of physically removing frozen fluid from the treated material (e.g., scraping, vibrating, shearing, etc.).
- 286 With gas or vapor flow to remove frozen fluid:**
 This subclass is indented under subclass 285. Process of contacting the frozen treated material with a gas or vapor flow to remove the frozen fluid.
 (1) Note. This gas or vapor flow could melt, sublimate, or separate the moisture from the treated material.
- 287 Including vacuum:**
 This subclass is indented under subclass 284. Process of applying subatmospheric pressure to the material being treated during the freeze-drying process.
- 288 And spray freeze or immersion:**
 This subclass is indented under subclass 287. Process involving injecting the material being treated into a chamber subjected to a vacuum, or submerging the material in a cooling fluid also within a chamber subjected to a vacuum.
- 289 And heating:**
 This subclass is indented under subclass 287. Process involving increasing the temperature of the material treated or the separated frozen or unfrozen fluid to promote the removal or separation of the moisture from the treated material or a treatment chamber.
- 290 Continuous processing:**
 This subclass is indented under subclass 289. Process including moving material to be treated into and out of a drying zone without interruption of the drying process.
- 291 Including mixing or agitating:**
 This subclass is indented under subclass 290. Process involving stirring or churning of the treated material.
- 292 With gas or vapor treating (e.g., filtering or condensing):**
 This subclass is indented under subclass 290. Process combined with adding any character of material to or removing any character of material from the gas or vapor derived from the freeze-drying process.
 (1) Note. This process could involve filtering, condensation, moisturizing, etc. of the derived gas or vapor.
- 293 With gas or vapor treating:**
 This subclass is indented under subclass 289. Process combined with adding any character of material to or removing any character of material from the gas or vapor derived from the freeze-drying process.

- (1) Note. This process could involve filtering, condensation, moisturizing, etc. of the derived gas or vapor.
- 294 Desiccant or molecular sieve:**
This subclass is indented under subclass 289. Process wherein the gas or vapor is subjected to a substance that has a high affinity for water, such as calcium oxide, or a straining device at the molecular level that primarily removes moisture from the gas or vapor by absorption or adsorption.
- 295 Including mixing or agitating:**
This subclass is indented under subclass 289. Process involving stirring or churning of the treated material.
- 296 Having specific container:**
This subclass is indented under subclass 289. Process wherein the vessel for the treated material is of a unique or special type such as a glass bottle, test tube, jar, etc.
- 297 Having specific type of material support:**
This subclass is indented under subclass 289. Process wherein the underlying holder for the treated material is of a unique or special type such as shelving, a removable tray, stacked treatment units, etc.
- 298 With gas or vapor treating:**
This subclass is indented under subclass 284. Process combined with adding any character of material to or removing any character of material from the gas or vapor derived from the freeze-drying process.
- (1) Note. This process could involve filtering, condensing, moisturizing, etc. of the derived gas or vapor.
- 299 Desiccant or molecular sieve:**
This subclass is indented under subclass 298. Apparatus wherein the gas or vapor is subjected to a substance that has a high affinity for water, such as calcium oxide, or a strainer at the molecular level that primarily removes moisture from the gas or vapor by absorption or adsorption.
- 300 Using filter:**
This subclass is indented under subclass 298. Process wherein the gas or vapor derived from the freeze-drying process is subjected to a straining process primarily to remove particulate material.
- 301 With additional material cooling by separate refrigeration means:**
This subclass is indented under subclass 287. Process combined with use of an extra means for cooling the treated material in addition to the basic cooling means that produces cooling by the vaporization of liquid from the treated material.
- 302 Congealing or thickening:**
This subclass is indented under subclass 282. Process of treating a flowable material wherein the material is jelled or stiffened in any way.
- SEE OR SEARCH CLASS:
425, Plastic Article or Earthenware Shaping or Treating: Apparatus, subclasses 6+ for apparatus to make particulate material (e.g., shot) directly from liquid or molten material.
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 98+ for colloid systems of continuous or semicontinuous solid phase with discontinuous liquid phase (gels, pastes, flocs, coagulates) or agents for such systems or making or stabilizing such systems or agents, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.
- 303 By adding congealing or thickening agent:**
This subclass is indented under subclass 302. Process wherein a substance is mixed with the material treated which does not result in a chemical reaction with the treated material but the result of the interaction is a congealing or thickening of the material treated.
- (1) Note. This subclass differs from subclasses 329+ in that the processes in this subclass involve treating a flowable material to increase its viscosity, while

subclasses 329+, which also provide for the addition of a treating agent, involve treating both flowable and nonflowable material to produce a solid or particulate mass.

304 By cooling of treated material:

This subclass is indented under subclass 302. Process wherein the material treated is thickened or congealed by reducing its temperature.

305 By evaporating moisturizing fluid:

This subclass is indented under subclass 302. Process wherein the material treated is thickened or congealed by the vaporization of the wetting agent in the material treated.

- (1) Note. This includes boiling, vacuum treatment, evaporation by exposure to a desiccant, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

287+, for freeze-drying by vacuum.

306 Sheet or web contact preventing by spacer sheet, web, or strand:

This subclass is indented under subclass 282. Process in which sheets are treated while separated from one another by another separating sheet, web, or strand or parts of a web are separated from other parts by an added separating sheet or web.

SEE OR SEARCH THIS CLASS, SUBCLASS:

94, for the corresponding apparatus.

SEE OR SEARCH CLASS:

101, Printing, subclasses 417 and 419 for interleaving sheets with other sheets or webs where no positive drying step is claimed or where such processes are combined with printing, whether or not positive drying is claimed.

307 Retarding or shielding of treatment:

This subclass is indented under subclass 282. Process involving slowing of the treating action either over the entire object being dried or over selected areas by buffering against the treating operation.

- (1) Note. The buffering may be done in any manner such as coating, mounting in a frame, etc.

308 Radiation applying with shielding:

This subclass is indented under subclass 307. Process wherein radiation treatment strength is selectively applied to particular areas of the material treated through the action of a radiation barrier.

SEE OR SEARCH THIS CLASS, SUBCLASS:

245+, for full application of radiation during treatment.

309 Shielding by selective application of gas or vapor flow:

This subclass is indented under subclass 307. Process wherein the treating gas or vapor is directed to particular areas on the treated material by altering the velocity or direction of flow of the treating gas or vapor from its source, which results in differential exposure by the treating gas or vapor.

310 Application of temporary coating:

This subclass is indented under subclass 307. Process wherein a material is attached to the material treated to transiently cover the material treated, which would provide particular areas with differential treatment.

311 Shielding by use of physical barrier to treating gas or vapor:

This subclass is indented under subclass 307. Process wherein a buffer not attached to the material treated is associated with the material and arranged to provide differential gas or vapor contact on successive areas of the material treated.

312 By centrifugal force:

This subclass is indented under subclass 282. Process comprising subjecting the materials undergoing treatment to the force on an object in curvilinear motion that is directed away from the center of curvature or axis of rotation.

- (1) Note. This may be for any purpose, as for causing the material to move, preventing shrinkage of material, etc.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
58 and 59, for an apparatus that uses centrifugal force.
- SEE OR SEARCH CLASS:
134, Cleaning and Liquid Contact With Solids, subclasses 17 and 33 for a process using centrifugal force.
494, Imperforate Bowl: Centrifugal Separators, subclass 37 for a process of that class and see the reference to that class appearing in (3) Note of the definition of this class (34).
- 313 Continuous processing:**
Process under 312 wherein the material treated enters and exits the centrifugal force applying means without interruption of the centrifugal action on the material.
- 314 With centrifugal spraying of the treated material:**
Process under 313 wherein the material treated is a suspension or slurry injected into a treatment zone in a manner such that solids within the dispersed material are separated from a carrier liquid by the action of centrifugal force.
- 315 With heating:**
This subclass is indented under subclass 313. Process wherein an increase in temperature is provided in the treating process.
- 316 With recirculation of treated material:**
This subclass is indented under subclass 313. Process wherein a portion of the entire stream of treated material is directed back into the treatment zone after exiting the treatment zone.
- 317 With carrier for thin discrete article:**
This subclass is indented under subclass 312. Process wherein a thin substrate-type article is supported in a device that holds individual or a plurality of articles while being subjected to centrifugal force.
- 318 Rotating drum or basket:**
This subclass is indented under subclass 312. Process wherein a vessel containing the treated material is a revolvable container that subjects the material undergoing treatment to centrifugal force as a result of its revolving.
- 319 Variable speed:**
This subclass is indented under subclass 318. Process wherein the velocity of rotation of the vessel containing the treated material is changed during treatment.
- (1) Note. The variable speed set forth in this subclass definition does not include the speed variations that occur during the activation or deactivation of the means causing the rotation of the rotatable vessel.
- 320 With pressurized atmosphere:**
This subclass is indented under subclass 318. Process wherein the pressure within the treating vessel is maintained above atmospheric pressure for a portion of or the entire treating process.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
325, for pressurized treatment without the application of centrifugal force in a rotatable vessel.
- 321 Including heating:**
This subclass is indented under subclass 318. Process wherein an increase in temperature is applied to the treated material.
- 322 Foraminous basket:**
This subclass is indented under subclass 318. Process wherein the vessel holding the treated material has a plurality of openings in its wall members that permit the flow of liquid or gas or vapor yet hold the treated material within the vessel.
- 323 With fluidizing of treated material:**
This subclass is indented under subclass 322. Process including liquefying the treated material during the treating process.
- 324 With inert atmosphere:**
This subclass is indented under subclass 318. Process wherein a gas or vapor or mixture of gas or vapor other than air alone is supplied to the rotatable vessel and the gas or vapor or mixture is not chemically reactive with the treated material.

- 325 With pressurized atmosphere:**
This subclass is indented under subclass 312. Process wherein the pressure within the treating zone is above atmospheric.
- 326 Rotating gas or vapor stream:**
This subclass is indented under subclass 312. Process wherein the treated material is conveyed by a revolving gas or vapor current such that the material is subjected to centrifugal force.
- 327 With heating:**
This subclass is indented under subclass 326. Process wherein an increase in temperature is supplied to the treating process.
- 328 With additional conveying means:**
This subclass is indented under subclass 312. Process wherein the treated material is subjected to a means for transporting other than the transporting means applied to the treated material that causes the material to be subjected to centrifugal force.
- 329 With contacting of material treated with solid or liquid agent:**
This subclass is indented under subclass 282. Process involving contacting the treated material with either a liquid or solid to promote drying or fluid cooling operation of the treated material but not merely to cause motion of or apply mechanical pressure to the material undergoing treatment.
- (1) Note. The drying operation on the treated material is usually by absorption, adsorption, or adhesion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
71, 94, and 95, for corresponding apparatus for contacting material undergoing treatment with solids.
306, for spacer sheets and webs.
307, for the shielding or retarding of drying by the application of solid material to the material undergoing treatment or the use of a surface coating on the treated material.
376, for recirculation of the material undergoing treatment, including the adding of material to be treated to the recirculated treated material.
- 397, for expressing or other mechanical liquid removal combined with drying.
402+ and 414+, for passing material through a liquid seal.
443+, for a process including contact of the material with gases and vapors.
- SEE OR SEARCH CLASS:
134, Cleaning and Liquid Contact With Solids, for a process of cleaning combined with drying and for a process of cleaning, per se, even though the cleaning is by gas or vapor contact with solids. Class 34 has drying, per se, regardless of the operations used.
201, Distillation: Processes, Thermolytic, subclasses 10+ for a thermolytic distillation process involving contacting the material undergoing treatment with a hot liquid or solid.
260, Chemistry of Carbon Compounds, subclasses 110 and 705 for extraction.
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 255+ for dissolving, extracting, or bleaching apparatus.
423, Chemistry of Inorganic Compounds, for a process directed to extracting, leaching, or dissolving therein provided for, and subclass 658.5 for extracting, leaching, or a dissolving process not elsewhere provided for.
427, Coating Processes, for a process of applying a liquid to a substrate to form a coating.
- 330 With regeneration or removal of treating agent:**
This subclass is indented under subclass 329. Process wherein the solid or liquid treating agent added to the material is treated itself to renew its capacity to treat the material or is removed from the treatment process after use.
- 331 Treating agent consists of both solid and liquid:**
This subclass is indented under subclass 330. Process wherein the treating agent has both solid and liquid constituents.

- 332 Treating agent is a solid:**
This subclass is indented under subclass 330. Process wherein the treating agent is a solid material that collects moisture from the treated material.
- 333 With treating of solid material:**
This subclass is indented under subclass 332. Process wherein the treated material is a solid material.
- 334 With treating of suspension or slurry:**
This subclass is indented under subclass 332. Process wherein the material treated is a flowable mixture of solid particles dispersed in a liquid.
- 335 Using absorbent band or belt:**
This subclass is indented under subclass 332. Process wherein moisture is soaked up by a blotting ribbon or strap of material contacting the material being treated.
- 336 Using absorbent roller:**
This subclass is indented under subclass 332. Process wherein moisture is soaked up by a blotting cylinder contacting the treated material.
- 337 Treating agent is a liquid:**
This subclass is indented under subclass 330. Process wherein the treating agent is a liquid.
- 338 With treatment of suspension or slurry:**
This subclass is indented under subclass 337. Process wherein the material treated is a mixture of solid particles dispersed in a liquid.
- 339 With treatment of solid material:**
This subclass is indented under subclass 337. Process wherein the material treated is a solid material.
- 340 Treating liquid displaces moisture:**
This subclass is indented under subclass 339. Process wherein the liquid treating agent replaces moisture in the material by the action of the treating liquid supplanting the moisture.
- (1) Note. Normally, additional treatment is necessary to remove the treating liquid from the treated material after displacement of the moisturizing fluid.
- 341 Treating liquid absorbs moisture:**
This subclass is indented under subclass 339. Process wherein the moisture is removed from the treated material by the action of the moisture being drawn into the treating liquid.
- 342 Using multiple treating liquids:**
This subclass is indented under subclass 339. Process wherein more than one treating liquid is applied to the treated material.
- 343 With addition of heat to drying process:**
This subclass is indented under subclass 329. Process wherein external heat is added to the drying process to increase the drying action of the treated material.
- (1) Note. The heat added during this process is primarily added for the purpose of enhancing the interaction between the solid or liquid agent and the material treated, with the ultimate purpose of increasing the rate of the drying process.
- 344 Treating agent consists of both solid and liquid:**
This subclass is indented under subclass 343. Process wherein the treating liquid has both solid and liquid constituents.
- 345 Treating agent is a solid:**
This subclass is indented under subclass 343. Process wherein the treating agent is a solid material that collects moisture from the treated material.
- 346 Solid treating agent treats same material:**
This subclass is indented under subclass 345. Process wherein the solid treating agent is a solid dehydrated form of the treated material.
- 347 Treating of suspension or slurry:**
This subclass is indented under subclass 345. Process wherein the treated material is a mixture of solid particles dispersed in a liquid.
- 348 Treating agent is a liquid:**
This subclass is indented under subclass 343. Process wherein the treating agent is a liquid that removes moisture from the treated material without the addition of external heat.

- 349 Treating suspension or slurry:**
This subclass is indented under subclass 348. Process wherein the treated material is a mixture of solid particles dispersed in a liquid.
- SEE OR SEARCH CLASS:
159, Concentrating Evaporators, for concentrating slurries, suspensions, or solutions without the addition of a treating agent or cooling.
- 350 Treating solid material:**
This subclass is indented under subclass 348. Process wherein the treated material is a solid.
- 351 Treating agent displaces moisture:**
This subclass is indented under subclass 350. Process wherein the liquid treating agent replaces moisture in the material by action of the treating liquid supplanting the moisture.
- 352 Treating agent absorbs moisture:**
This subclass is indented under subclass 350. Process wherein the liquid treating agent assimilates moisture from the treated material.
- 353 Solid treating agent treats solid material:**
This subclass is indented under subclass 329. Process wherein the treating agent is a solid material and the treated material is also a solid material.
- (1) Note. Solid treated material here differs from the mixture of solids and liquids treated that are found in subclass 356.
- 354 Using agitation or mixing:**
This subclass is indented under subclass 353. Process wherein the treating agent and the treated material are subjected to churning or stirring.
- 355 Using absorbent band or belt:**
This subclass is indented under subclass 353. Process wherein moisture is blotted up by a ribbon or strap of material that contacts the treated material.
- 356 Solid treating agent treats suspension or slurry:**
This subclass is indented under subclass 329. Process wherein the treated material is a mixture of solid particles dispersed in a liquid and the treating agent is a solid material.
- 357 Liquid treating agent treats solid material:**
This subclass is indented under subclass 329. Process wherein a liquid treating agent contacts a treated material that is a solid material.
- 358 Treating agent absorbs moisture:**
This subclass is indented under subclass 357. Process wherein the liquid treating agent assimilates the moisture.
- 359 With fluid current conveying or suspension of treated material:**
This subclass is indented under subclass 282. Process in which the treated material is moved or buoyed up by a gas or vapor flow during treating.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
443, for a process for contacting material with gas or vapor that does not suspend the material.
444, for a process for conveying a sheet, web, or strand and 640 for apparatus for conveying a sheet, web, or strand.
576, for fluid current conveying.
- SEE OR SEARCH CLASS:
201, Distillation: Processes, Thermolytic, subclass 31 for a process of thermolytic distillation in which the material being treated is held suspended by a gas or vapor.
209, Classifying, Separating, and Assorting Solids, and see the search notes in this class (34) for the line between these classes.
432, Heating, subclass 15 for a process of heating particulate work including the maintenance of a fluidized bed.
- 360 Suspension of treated material:**
This subclass is indented under subclass 359. Process wherein the gas or vapor supplied to the treated material primarily buoys up the treated material.

- 361 Including applying vacuum:**
This subclass is indented under subclass 360. Process wherein the material treated is subjected to subatmospheric pressure while the material is suspended.
- (1) Note. This treatment will normally be carried out in a closed or sealed chamber to maintain the subatmospheric environment.
- 362 Including pressurizing atmosphere:**
This subclass is indented under subclass 360. Process wherein the treated material is subjected to pressure above atmospheric during treatment.
- (1) Note. This treatment will normally be carried out in a closed or sealed chamber to maintain the pressurized environment.
- 363 With additional heat exchange:**
This subclass is indented under subclass 360. Process wherein the treated material is subjected to supplementary heat transfer other than that supplied by the vapor or gas used for suspending the treated material.
- 364 Including gas or vapor flow variation:**
This subclass is indented under subclass 360. Process wherein the rate of the gas or vapor flow is controlled to change during the processing of the treated material.
- 365 Pulsed flow:**
This subclass is indented under subclass 364. Process wherein the gas or vapor is controlled to be discharged in short, distinct, timed bursts of gas onto the treated material.
- 366 Including downward impinging fluid flow:**
This subclass is indented under subclass 360. Subject matter wherein the suspending current of the gas or vapor is directed to the upper surface of the treated material.
- 367 With additional conveying:**
This subclass is indented under subclass 360. Process combined with use of a means for transporting the treated material other than the suspending current.
- 368 Including agitating or comminuting of treated material:**
This subclass is indented under subclass 360. Process wherein the treated material is mixed or pulverized by a means other than the suspending current.
- 369 Including baffle or deflector to adjust material flow:**
This subclass is indented under subclass 360. Process wherein the flow of the treated material is controlled by a variable or fixed obstruction to the flow path of the treated material.
- 370 With plural treating zones:**
This subclass is indented under subclass 360. Process wherein the treated material is subjected to multiple suspension or fluidized treatments at different locations or the material is subjected to the combination of a suspension or fluidized treatment at one location and another gas or vapor treatment at a different location.
- 371 Including material separators or sorters:**
This subclass is indented under subclass 360. Process wherein means are provided to remove the treated material from other suspended material in the treating zone or combined with means provided to sort and classify the treated material.
- 372 Spray drying and cooling of slurry or suspension:**
This subclass is indented under subclass 359. Process wherein a mixture of particles dispersed in a liquid is directed through a nozzle to atomize the suspension or slurry for promoting intimate contact with drying gas or vapor stream that in addition to drying the suspension or slurry reduces the temperature of the suspension or slurry.
- (1) Note. It is essential that the suspension or slurry undergoes cooling to be placed here. If the suspension or slurry is heated during the drying process then the subject matter should go in Class 159, Concentrating Evaporators.

373 With contact with additional gas or vapor flow:

This subclass is indented under subclass 372. Process wherein a first gas or vapor is used to convey the suspension or slurry through an atomizing nozzle and a second gas or vapor is used to dry the resulting atomized solid-liquid stream.

374 Additional flow is countercurrent:

This subclass is indented under subclass 373. Process wherein the additional gas or vapor flow is directed either totally or partially against the direction of flow of the atomized solid-liquid stream.

375 Having embedded loop circulation of treated material:

This subclass is indented under subclass 359. Process wherein a portion or the entire body of the treated material is conveyed by way of a treating gas or vapor in a complete circle.

- (1) Note. See subclass 376, where the material is caused to recirculate without the assistance of a conveying fluid stream.

376 With treated material recirculation:

This subclass is indented under subclass 282. Process wherein the treated material after undergoing initial treatment is conveyed back to the same source for treatment.

377 Recirculation of a portion of the treated material:

This subclass is indented under subclass 376. Process wherein only a segment of the treated material is returned to the initial source for further treatment.

378 With additional treating of recirculated portion (e.g., heating, cooling, separating):

This subclass is indented under subclass 377. Process wherein an extra drying or nondrying treatment is applied to the portion of the treated material that is recirculated before the material is returned to the initial treatment source.

379 Recirculated portion mixed with untreated material:

This subclass is indented under subclass 377. Process wherein the recirculated portion of treated material is mixed with material not yet treated.

380 With nondrying treating of material:

This subclass is indented under subclass 282. Process wherein in addition to the primary drying or gas or vapor contact with the treated material there is an additional treating applied other than drying.

- (1) Note. Steps for moving, feeding, discharging, agitating, piling, arranging, or controlling the thickness of the material have been treated as incidents to drying or gas and vapor contact operations.

SEE OR SEARCH THIS CLASS, SUBCLASS:

428, for cooling the material by contact by gas or vapor.

443+, for a process wherein the gas or vapor contacts the material multiple times, even though the contacting gas or vapor moisture content is varied for the purpose of controlling the moisture content of the material undergoing treatment.

381 Nondrying treating precedes drying:

This subclass is indented under subclass 380. Process wherein the nondrying treating takes place prior to the drying or gas or vapor contact with the treated material.

382 Material shaping:

This subclass is indented under subclass 381. Process wherein the nondrying treating consists of forming the treated material into pellets or treating the material to granulate it.

383 Puncturing or incising of treated material:

This subclass is indented under subclass 381. Process wherein the treated material is subjected to piercing or scoring for the purpose of promoting the drying process.

- 384 Grinding or comminuting:**
This subclass is indented under subclass 381. Process wherein the treated material is subjected to crushing to promote the drying process.
- 385 Material shaping:**
This subclass is indented under subclass 380. Process wherein the nondrying treating consists of forming the material into pellets or treating the material in order to granulate it.
- 386 Mixing or grinding:**
This subclass is indented under subclass 380. Process wherein the nondrying treating consists of stirring or crushing the treated material.
- 387 Shearing or comminuting:**
This subclass is indented under subclass 380. Process wherein the nondrying treating consists of shearing or deagglomerating the treated material.
- 388 Compacting or restraining:**
This subclass is indented under subclass 380. Process wherein the treated material is subjected to a force that compresses the material without expressing moisture or applying physical means to prevent the treated material from changing shape or form during treating.
- 389 Adding of nondrying treating substance:**
This subclass is indented under subclass 380. Process wherein a non-chemically reactive substance is added to the treated material where the added substance does not promote the removal of moisture from the treated material but does affect the physical nature of the treated material or the manner in which the drying operation is carried out.
- (1) Note. Some examples of the addition of nondrying treating substances could be the addition of saturated steam added to a wood drying process to encourage uniform drying of the wood, the addition of an inert gas to a drying process for the purpose of preventing combustion of the treated material, addition of a fabric softener to the drying process for clothes, etc.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
310, for shielding the treated material by application of a transient coating.
- 390 Deodorizer:**
This subclass is indented under subclass 389. Process wherein the nondrying treating substance functions to absorb or displace odors in the treated material.
- 391 Cooling of treated material:**
This subclass is indented under subclass 380. Process wherein the temperature of the treated material is reduced.
- 392 Contacting material with cooling drum or roller:**
This subclass is indented under subclass 391. Process wherein the temperature of the treated material is reduced by physically touching the material with a cylinder or barrel having a reduced temperature.
- 393 Contacting material with cooling fluid:**
This subclass is indented under subclass 391. Process wherein the treated material is contacted by a fluid having a lower temperature than the treated material.
- (1) Note. Fluid applied should be for cooling the material without adding moisture that would have to be removed by the drying process.
- 394 Cooling fluid drawn through material treated:**
This subclass is indented under subclass 393. Process wherein the cooling fluid is pulled through the treated material by suction.
- 395 Cooling fluid is ambient air:**
This subclass is indented under subclass 393. Process wherein the cooling fluid is encircling air.
- 396 Treated material is wood:**
This subclass is indented under subclass 393. Process wherein the treated material is wood.

397 Mechanical liquid removal:

This subclass is indented under subclass 282. Process involving the removal of liquid from solids mechanically (i.e., by an operation other than heating or gas or vapor contact).

SEE OR SEARCH THIS CLASS, SUB-CLASS:

69+, and see the notes thereto.

397+, for other mechanical liquid removal.

SEE OR SEARCH CLASS:

100, Presses, for expressing and see the reference to Class 100 in (3) Note of the main class definition of this class (34) for the line between classes.

210, Liquid Purification or Separation, for decanting or filtering and see the reference to Class 210 in (3) Note of the class definition of this class (34) for the line between classes.

398 Using compression:

This subclass is indented under subclass 397. Process wherein mechanical force is applied to compact the treated material, which results in the removal of moisture.

(1) Note. When centrifugal force is applied for removal of moisture proper placement is in subclasses 312+.

399 Expressing liquid by use of roller:

This subclass is indented under subclass 398. Process wherein a cylinder contacts the treated material to create the compressive forces within the material to cause the removal of moisture.

400 Expressing liquid by moving treated material through restriction:

This subclass is indented under subclass 398. Process wherein the treated material is forced through a narrow passage in its path of flow, which creates compressive forces in the material that causes liquid to be removed from the material.

401 Using vibration:

This subclass is indented under subclass 397. Process wherein the treated material is subjected to mechanical reverberation to remove moisture from the treated material.

402 Gas or vapor pressure varies during treatment:

This subclass is indented under subclass 282. Process wherein treated material is subjected to a gas or vapor whose treatment pressure is maintained at multiple levels in at least one closed treatment vessel during treating or the pressure is changed in a continuous or discontinuous manner during the treating process.

(1) Note. Varying of pressure does not include the change in treating pressure as a result of starting up or shutting down the gas or vapor treating process.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

284+, for a process including freezing by application of a vacuum plus other treating.

329+, for other liquid contact processes.

403 Including subatmospheric pressure:

This subclass is indented under subclass 402. Process wherein the treated material is subjected to a below-atmospheric pressure during treating.

(1) Note. If subject matter is directed to freezing of treated material by vacuum, then the subject matter should be placed in subclasses 87+.

404 With addition of treating agent:

This subclass is indented under subclass 403. Process wherein a substance is applied to the treated material or the gas or vapor contacting the material for regulating or promoting the treating material.

(1) Note. Examples of such treating agents would be steam, inert gases, liquids that are evaporated during treating, or any combination of such agents.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

329+, for the application of a liquid or solid for the express purpose of drying.

- SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, for a chemical reaction between the treated material and the treating agent.
- 405 Including superatmospheric pressure:**
This subclass is indented under subclass 402. Process wherein the treated material is subjected to an above-atmospheric pressure during treating.
- 406 Gas or vapor pressure is subatmospheric:**
This subclass is indented under subclass 282. Process wherein the treated material is subjected to a constant below-atmospheric pressure in at least one treating vessel during treating.
- (1) Note. This subclass differs from subclass 403 in that subclass 403 has a variable pressure level, where the pressure levels in this subclass are constant.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
87+, for freezing of treated material by vacuum.
- 407 With condensation of vapor:**
This subclass is indented under subclass 406. Process wherein moisture is removed from the treating vapor during the treating process.
- 408 With heating:**
This subclass is indented under subclass 407. Process wherein the temperature of the treated material or the treating vapor increases.
- 409 Including addition of treating agent:**
This subclass is indented under subclass 406. Process wherein a modifying agent is added to the treating process to regulate or promote the treating of the material without a chemical reaction.
- (1) Note. See subclass 404 for a definition of a treating agent.
- 410 Treating agent is inert gas:**
This subclass is indented under subclass 409. Process wherein the treating agent used is a chemically nonreactive gas such as nitrogen, argon, helium, etc.
- 411 Treating agent is steam:**
This subclass is indented under subclass 409. Process wherein the treating agent is steam added to the treating gas or vapor.
- 412 With heating:**
This subclass is indented under subclass 406. Process wherein the treated material or the treating gas or vapor has its temperature increase.
- 413 Gas or vapor pressure is superatmospheric:**
This subclass is indented under subclass 282. Process wherein the treated material is subjected to a constant pressure above atmospheric in at least one closed treating vessel.
- (1) Note. See (1) Note in subclass 406.
- 414 Sheet, web, or strand:**
This subclass is indented under subclass 413. Process wherein the treated material is a broad, thin, rectangular piece or a cord or running-length member.
- 415 Including addition of treating agent:**
This subclass is indented under subclass 413. Process wherein a modifying agent is applied to the treated material or the treating gas or vapor to regulate or promote the treating of the material without a resulting chemical reaction.
- 416 Contacting gas or vapor with solid sorbent to store gas or vapor:**
This subclass is indented under subclass 282. Process wherein gas or vapor under the influence of pressure or vacuum is absorbed by a material that has an affinity for the gas or vapor, such as a hydride.
- 417 With sealing of treating chamber:**
This subclass is indented under subclass 282. Process using a fluid to close off the treating chamber from the atmosphere.

418 Diverse types of drying operations:

This subclass is indented under subclass 282. Process in which two or more distinct drying operations are used.

- (1) Note. Where a plurality of drying operations of the same type are employed, the patent is in the appropriate succeeding subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 68, to complete the search for the apparatus.
443, for the application of a flame to the material.
498, for agitation or other motion of the treated material.
516 and 517, for sequential treatment of material with diverse gases or vapors.

419 Sheet, web, or strand:

This subclass is indented under subclass 418. Process wherein the material is a broad, thin, rectangular piece or a cord or running-length member.

420 Including radiation or convection treatment:

This subclass is indented under subclass 419. Process wherein the diverse types of drying operations include at least radiation or direct contact with a heated surface where the radiation treatment is infrared.

421 Running length:

This subclass is indented under subclass 420. Process wherein the treated material is conveyed through a treating zone as a continuous length.

422 Running length:

This subclass is indented under subclass 419. Process wherein the treated material is conveyed through a treating zone as a continuous length.

423 Sequential drying treatments:

This subclass is indented under subclass 418. Process wherein multiple drying operations are applied individually and in a specific order.

424 Of slurry or suspension:

This subclass is indented under subclass 423. Process wherein the treated material is a mixture of solid particles dispersed in a liquid.

425 Using rotating drum:

This subclass is indented under subclass 423. Process wherein at least one of the diverse drying treatments uses a revolving cylinder.

426 Plural treatments at same location:

This subclass is indented under subclass 418. Process wherein the diverse drying operations are applied to the treated material at the identical location.

427 Combined:

This subclass is indented under subclass 282. Process in which there is combined with the material drying or gas or vapor contact process a process step or steps of some other kind, not provided for above.

- (1) Note. The material drying or gas or vapor contact process includes the treatment of the gas or vapor used or evolved.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 85 through 90, for corresponding apparatus combinations.
513, for processes involving the treatment of the material with a gas or vapor and the conservation of heat during the process.

428 Cooling by gas or vapor contact:

This subclass is indented under subclass 282. Process wherein the temperature of the treated material is lowered by passing a gas or vapor in contact with the material.

- (1) Note. Apparatus for cooling only by contacting a gas or vapor with the material is classified in the appropriate apparatus subclass below and cross-referenced here.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 391, and apparatus subclasses 6+, for cooling combined with drying.

- 402, for cooling by application of a vacuum.
- 429 Including conveyor:**
This subclass is indented under subclass 428. Process wherein the material is moved through a cooling zone by a transporting means.
- 430 Gas or vapor flow to top and bottom of treated material:**
This subclass is indented under subclass 429. Process wherein gas or vapor is directed to upper and lower surfaces of conveyed, treated material.
- 431 Gas or vapor flow to bottom of treated material:**
This subclass is indented under subclass 429. Process wherein gas or vapor is directed to the lower surface of conveyed, treated material.
- 432 Gas or vapor flow concurrent or counter-current to treated material flow:**
This subclass is indented under subclass 429. Process wherein the treating gas or vapor is directed in a parallel path flowing in the same direction as the treated material, or is directed in a parallel path flowing in the opposite direction of the treated material.
- 433 Gas or vapor flow to top and bottom of treated material:**
This subclass is indented under subclass 428. Process wherein the gas or vapor is directed to upper and lower surfaces of treated material.
- 434 Gas or vapor flow to bottom of treated material:**
This subclass is indented under subclass 428. Process wherein gas or vapor is directed to the lower surface of treated material.
- 435 Gas or vapor flow concurrent or counter-current to treated material flow:**
This subclass is indented under subclass 428. Process wherein the treating gas or vapor is directed in a parallel path flowing in the same direction as the treated material, or is directed in a parallel path flowing in the opposite direction of the treated material.
- 436 Gravity flow of treated material:**
This subclass is indented under subclass 435. Process wherein the motion of the treated material is due entirely to the effects of gravity.
- 437 Treating hollow article:**
This subclass is indented under subclass 282. Process wherein the treated article has an empty space in its interior.
- 438 Having conveyor:**
This subclass is indented under subclass 437. Process wherein the hollow article is moved through a treating zone by a transporting means.
- 439 Treating fluid directed to interior and exterior of hollow article:**
This subclass is indented under subclass 437. Process wherein the treating fluid is directed to the inside and outside of the hollow article.
- 440 With specific support for hollow article:**
This subclass is indented under subclass 437. Process wherein the hollow article is mounted on a specialized brace during treating.
- 441 Support surrounds hollow article:**
This subclass is indented under subclass 440. Process wherein the exterior of the hollow article is encompassed by the support.
- 442 Form-supported treated article:**
This subclass is indented under subclass 282. Process wherein the treated article is held on supports that have the configuration of the treated article.
- 443 Gas or vapor contact with treated material:**
This subclass is indented under subclass 282. Process in which the material is treated with a gas or vapor that may or may not be heated.
- (1) Note. Treatment by a flame or combustion product is in this subclass or the indented subclasses.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
402, for a process including vacuum, gas, or vapor pressure varying or control or fluid sealing.

- 418, for treating with a gas or vapor either heated or unheated in combination with heating of the material or in combination with any other diverse treatment or the material itself.
- 511+, for a process that merely supports the material in the air and lets nature take its course.
- 444 Sheet, web, or strand:**
This subclass is indented under subclass 443. Process wherein the treated material is a broad, thin, rectangular piece or a cord or running-length member.
- 445 With drying parameter control:**
This subclass is indented under subclass 444. Process wherein gas or vapor conditions that influence the drying processes are regulated or varied.
- 446 Temperature or moisture control of material treated or treating gas or vapor:**
This subclass is indented under subclass 445. Process wherein the temperature or humidity of the treating gas or vapor or the treated material is regulated.
- 447 Material speed control:**
This subclass is indented under subclass 445. Process wherein the velocity of the treated material is regulated during treating.
- 448 Vapor or gas treatment:**
This subclass is indented under subclass 444. Process having any one or a combination of (a) the use of gases having different degrees of vapor concentration; (b) changing or maintaining constant the vapor concentration by adding or removing gases or vapors; (c) adding any characteristic of material to or removing any characteristic of material from the treating gas or vapor.
- 449 Condensation of gas or vapor:**
This subclass is indented under subclass 448. Process wherein the treating gas or vapor is treated to cause the condensation of the treating gas or vapor or any constituent thereof.
- 450 Combustion of gas or vapor:**
This subclass is indented under subclass 448. Process wherein the treating gas or vapor undergoes burning during the treating process.
- 451 Plural treating chambers:**
This subclass is indented under subclass 444. Process wherein the treated material is treated in more than one gas or vapor treating chamber.
- 452 Gas or vapor drawn through treated material:**
This subclass is indented under subclass 444. Process wherein the treating gas or vapor is pulled from one side of the material to the other side of the material.
- 453 Using vacuum roller:**
This subclass is indented under subclass 452. Process wherein the sheet, web, or strand is transported over a cylinder having a vacuum inside that draws the gas or vapor through the material.
- 454 With contact with heat exchanger (e.g., drum or roller):**
This subclass is indented under subclass 444. Process wherein the treated material directly touches a heat removing device, such as a barrel or a cylinder.
- 455 Pocket ventilator:**
This subclass is indented under subclass 452. Process wherein a loop formed by the web between adjacent drying or web guiding devices is subjected to an aerating flow of gas or vapor into or out of a pocket.
- 456 Vacuum causes web to contact wire or felt:**
This subclass is indented under subclass 455. Process wherein ventilation of the pocket creates a vacuum that causes the treated web to be urged into contact with or increases the contact pressure between the web and its supporting wire or felt.
- 457 With guide roller:**
This subclass is indented under subclass 455. Process wherein a cylinder contacts the web being treated primarily for the purpose of directing the treated web through a series of treating drums.
- (1) Note. It is possible to have heat exchange or vapor contact with the web by contact with a guide roller. However, this function would be secondary to its

- intended purpose of directing the web through the major treatment drums.
- 458 With vacuum guide roller:**
This subclass is indented under subclass 452. Process wherein a cylinder whose surface is subjected to a vacuum contacts the web being treated primarily for the purpose of directing the web through a series of treating drums.
- 459 Running length of treated material:**
This subclass is indented under subclass 444. Process wherein a sheet, web, or strand is conveyed through a treating zone in a continuous manner without a designed physical separation in the length of the treated material.
- 460 Gas or vapor suspends treated material:**
This subclass is indented under subclass 459. Process wherein the sheet, web, or strand is conveyed on a cushion of gas or vapor.
- 461 Gas or vapor directed to opposed surfaces of material:**
This subclass is indented under subclass 460. Process wherein the supporting gas or vapor stream is directed to surfaces that are directly opposite each other.
- 462 With spacing or coiling:**
This subclass is indented under subclass 459. Process wherein the sheet, web, or strand is held in spaced relation such as loops or successive passes to facilitate the circulation of a gas or vapor, or is treated while rolled or coiled.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
306, for a process involving spacer sheet or web.
437, where the sheet, web, or strand is in the form of a hollow article (e.g., is coiled or rolled so as to form a cake or bobbin) and is treated or handled as a hollow article.
518, for piling or arranging material other than a sheet or web.
- 463 Directing of gas or vapor:**
This subclass is indented under subclass 459. Process wherein the location of application of the treating gas or vapor is controlled.
- 464 Gas or vapor directed to opposed surfaces of material:**
This subclass is indented under subclass 463. Process wherein the treating gas or vapor is directed to surfaces of the material that are directly opposite each other.
- 465 Gas or vapor directed to single surface of material:**
This subclass is indented under subclass 463. Process wherein the gas or vapor is directed to only one surface of the treated material.
- 466 With spacing, coiling, or rolling:**
This subclass is indented under subclass 444. Process wherein the sheets or parts of webs or strands are held in spaced relation such as in loops or successive passes to facilitate the circulation of a gas or vapor, or are treated while rolled or coiled.
- 467 Treatment of gas or vapor:**
This subclass is indented under subclass 443. Process involving any one or a combination of: (a) the use of gases having different degrees of vapor concentration regardless of how obtained; (b) changing or maintaining constant the vapor concentration by adding or removing gas or vapors; (c) adding any characteristic of material to or removing any characteristic of material from the treating gas or vapor.
- (1) Note. Dry steam is treated as a gas.
- (2) Note. Since the contact of a gas or vapor with material to be dried is for the purpose of removing liquids from the material with necessary increase in concentration, and heating necessarily decreases the vapor concentration, the vapor concentration control or varying must be from other causes.
- (3) Note. The removal of materials from the gases or vapors after discharge from the treating zone is included here.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
516 and 517, for mere sequential treatment with gases or vapors without treating the gas or vapors.

- 468 Condensation of gas or vapor:**
This subclass is indented under subclass 467. Process wherein the treating gas or vapor undergoes a change from gas or vapor to liquid during the treating of a material.
- 469 Collecting of condensed gas or vapor:**
This subclass is indented under subclass 468. Process wherein the condensate from the treating gas or vapor is directed to a means to store the condensate as a product or reuse in the treating process.
- 470 With vaporization of condensed gas or vapor:**
This subclass is indented under subclass 469. Process wherein the collected condensate is revaporized for reuse as a treating gas or vapor.
- 471 Regulating temperature of gas or vapor:**
This subclass is indented under subclass 468. Process involving any combination of: (a) using a gas or vapor at particular temperatures; (b) employing a step or steps to maintain particular temperatures; (c) employing a plurality of different temperatures of either the same or different gas or vapor treating media; (d) heating the gas or vapor a plurality of times.
- (1) Note. Mere specification that the gas is heated or the mere step of heating does not cause classification here; see appropriate subclass below.
- (2) Note. Since hot gases or vapors contacting cooler material are necessarily cooled, the statement of such fact does not cause classification here. The different temperatures must be the temperatures before contact.
- 472 Absorption/adsorption of gas or vapor released from treated material:**
This subclass is indented under subclass 467. Process wherein the treating gas or vapor or constituents within the treating gas or vapor are drawn into and collected in a material that has an affinity for the treating gas or vapor.
- 473 Regeneration of absorption/adsorption material:**
This subclass is indented under subclass 472. Process wherein the collected gas or vapor is removed from the collecting material.
- 474 Gas or vapor humidity regulation:**
This subclass is indented under subclass 467. Process wherein the percentage of moisture within the treating gas is controlled.
- 475 And gas or vapor temperature regulation:**
This subclass is indented under subclass 474. Process wherein the temperature of the treating gas or vapor is controlled.
- 476 Gas or vapor temperature regulation:**
This subclass is indented under subclass 467. Process wherein the temperature of the treating gas or vapor is controlled.
- 477 With recirculation of gas or vapor:**
This subclass is indented under subclass 476. Process wherein the treating gas or vapor after contacting the treated material is brought back into contact with the material to treat the material at least one more time.
- 478 Combustion of gas or vapor:**
This subclass is indented under subclass 467. Process wherein the treating gas or vapor is subjected to burning after contacting the treated material.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
443, for the production of treating gas by combustion of a fuel gas.
- 479 Combusted gas or vapor recirculated to treating chamber:**
This subclass is indented under subclass 478. Process wherein the products of combustion from the burning of the treating gas or vapor are returned to the treating environment.

480 Filtering of gas or vapor:

This subclass is indented under subclass 467. Process wherein the treating gas or vapor is directed through a purifying medium to remove or separate particulate matter from the treating gas or vapor.

481 Material thickness controlled:

This subclass is indented under subclass 443. Process wherein the dimensions of a layer of treated material are regulated.

482 Material speed or quantity controlled:

This subclass is indented under subclass 443. Process wherein the rate of motion or the amount of treated material is regulated.

483 By moisture content of treated material:

This subclass is indented under subclass 482. Process wherein the percentage of moisture contained in the treated material regulates the speed or quantity of the treated material.

484 And temperature of material or chamber:

This subclass is indented under subclass 483. Process wherein the temperature of the treated material or the temperature of a treating chamber regulates the speed or quantity of the treated material.

485 By temperature of material or chamber:

This subclass is indented under subclass 482. Process wherein the temperature of the treated material or the temperature of a treating chamber regulates the speed or quantity of the treated material.

486 Timing of application of gas or vapor to treated material based on drying variables:

This subclass is indented under subclass 443. Process wherein the amount of time that the treating gas or vapor is applied to the treated material is regulated as a result of (a) measurements of drying parameters; (b) comparison of drying parameters; (c) calculations based on drying parameters.

- (1) Note. Drying parameters are basically defined as those physical characteristics associated with the drying process whose variability directly or indirectly affect the rate of drying of a treated material.

487 Gas or vapor flow directing or control:

This subclass is indented under subclass 443. Process wherein the location of application of the treating gas or vapor or the quantity of treating gas or vapor is regulated.

488 Flow direction changes during treatment:

This subclass is indented under subclass 487. Process wherein the point of application of the treating gas or vapor is varied or changed during treatment.

489 Reversible flow:

This subclass is indented under subclass 488. Process wherein the direction of flow of the treating gas or vapor onto the treated material is directed to flow substantially opposite to its initial flow direction.

SEE OR SEARCH THIS CLASS, SUBCLASS:

191, for apparatus using reversible gas or vapor flow.

490 Timed control:

This subclass is indented under subclass 489. Process wherein the treating gas or vapor flow is reversed under the control or influence of a clock.

491 Temperature or moisture content of treated material or chamber controls or directs gas or vapor:

This subclass is indented under subclass 487. Process wherein the temperature or humidity of the treated material affects the point of application of the treating gas or vapor.

492 Gas or vapor flow varied during treatment:

This subclass is indented under subclass 487. Process wherein the amount of gas or vapor applied to the treated material is changed during the treating process.

493 Temperature of treating gas or vapor controlled:

This subclass is indented under subclass 443. Process wherein the temperature of the treating gas or vapor is maintained or varied to desired levels.

- 494 To prevent damage to material or system:**
This subclass is indented under subclass 493. Process wherein the temperature of the treating gas or vapor is maintained at specified levels to prevent destruction to the treated material or the apparatus that constitutes the system.
- 495 Temperature of gas or vapor regulated by other drying variables:**
This subclass is indented under subclass 493. Process wherein the temperature of the gas or vapor is determined or controlled as a result of (a) measurements of drying parameters; (b) comparison of drying parameters; (c) calculations based on drying parameters.
- 496 Multiple temperature levels of gas or vapor:**
This subclass is indented under subclass 493. Process wherein the treating gas or vapor is maintained at several constant temperature levels during treatment.
- 497 Temperature of treating chamber regulated:**
This subclass is indented under subclass 443. Process wherein the temperature within the treating container is controlled.
- 498 With treated material motion:**
This subclass is indented under subclass 443. Process wherein the treated material is caused to have motion during treatment (a) relative to the support on which it rests, (b) relative to the enclosure in which it is located, or (c) the various parts of the material have motion relative to each other; such motion may be caused in any way, including the action of the gas or vapor.
- (1) Note. A car or conveyor that moves through the treating chamber is considered to cause the treated material motion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
359, for gas or vapor current conveying or suspending the treated material.
560, for apparatus for automatic control of rate of material motion.
- 499 Rotating drum:**
This subclass is indented under subclass 498. Process wherein the material motion is produced by a revolving cylinder.
- 500 With conveyor:**
This subclass is indented under subclass 498. Process wherein the material is moved through a treating zone by a transporting means.
- 501 Gas or vapor directed above and below material:**
This subclass is indented under subclass 500. Process wherein gas or vapor is applied to the upper and lower surfaces of the treated material.
- 502 Gas or vapor directed below material:**
This subclass is indented under subclass 500. Process wherein gas or vapor is applied to the lower surface of the treated material.
- 503 Concurrent gas or vapor flow:**
This subclass is indented under subclass 498. Process wherein the direction of flow of the treating gas or vapor and the direction of movement of the treated material are the same.
- 504 Countercurrent gas or vapor flow:**
This subclass is indented under subclass 498. Process wherein the direction of flow of the treating gas or vapor and the direction of movement of the treated material are opposite to each other.
- 505 Gravity flow of material:**
This subclass is indented under subclass 504. Process wherein the treated material is conveyed through a treating zone by gravity-induced motion.
- 506 Transverse flow of gas or vapor:**
This subclass is indented under subclass 498. Process wherein the treating gas or vapor flows across the treated material perpendicular to the direction of travel of the material.
- 507 Treating gas or vapor drawn through material:**
This subclass is indented under subclass 443. Process wherein the treating gas or vapor flows through the treated material normally under the influence of a vacuum.

508 Gas or vapor directed above and below treated material:

This subclass is indented under subclass 443. Process wherein the treating gas or vapor is directed to upper and lower surfaces of the treated material.

509 Gas or vapor directed below treated material:

This subclass is indented under subclass 443. Process wherein the treating gas or vapor is directed to the lower surface of the treated material.

510 Gas or vapor directed above treated material:

This subclass is indented under subclass 443. Process wherein the treating gas or vapor is directed to the upper surface of the treated material.

511 Natural ambient air drying of material:

This subclass is indented under subclass 443. Process wherein the treated material is dried by exposure to the encircling air.

512 Solar assisted:

This subclass is indented under subclass 511. Process wherein passive sun energy is applied to the treated material.

513 Heat conserving:

This subclass is indented under subclass 443. Process including steps for preserving heat.

- (1) Note. This may be done in any way, as by exchanging heat between incoming and outgoing gas and vapor or by burning the discharged gas or vapor and using the evolved heat.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 86, for apparatus for other modes of heat conservation, and see the notes there.
427, for other modes of heat conservation.

514 Exhaust gas or vapor from treatment zone heats treating gas or vapor:

This subclass is indented under subclass 513. Process wherein the treating gas or vapor is heated by direct or indirect contact with expelled gas from treating zone.

515 Heat pump or recompression increases heating effect:

This subclass is indented under subclass 514. Process wherein a heat pump or a compressor is used to increase the energy level of the exhausted gas prior to its heat exchange with the treating gas or vapor entering the treating zone.

516 Special gas or vapor:

This subclass is indented under subclass 443. Process in which a gas or vapor is used that is other than atmospheric air.

- (1) Note. Where there are sequential treatments by means of gas or vapor at least one treatment must be by a gas or vapor other than atmospheric air.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 67, for a special gas used with or generated by infrared energy.
446+, for treating the contact gas or vapor.

517 Vapor:

This subclass is indented under subclass 516. Process in which a vapor is used.

- (1) Note. It may be used either in a sequence with a gas or alone. When used in sequence with a gas, the gas may be air.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 402+, for use of vapor under vacuum or superatmospheric pressure.

518 Piling or arranging material treated:

This subclass is indented under subclass 443. Process directed to the piling, supporting, or arranging of the material treated in such a manner as to promote contact of the treating gas or vapor.

SEE OR SEARCH CLASS:

- 201, Distillation: Processes, Thermolytic, subclass 40 for a carbonizing process directed to the step of arranging the charge in the retort.
414, Material or Article Handling, subclass 8 for apparatus for placing articles in superposed abutment or in

- mutually sustaining relation in a horizontally extending row, or for shaping a formed group.
- 432, Heating, subclass 6 for a process of heating including stacking or aligning objects.
- 519 Conductive heating:**
This subclass is indented under subclass 282. Process wherein the treated material is dried by direct contact with a heated surface.
- 520 Within drum:**
This subclass is indented under subclass 519. Process wherein the treated material is enclosed within a cylinder structure for treatment.
- 521 With evolved gas or vapor treatment:**
This subclass is indented under subclass 519. Process wherein the gases generated during the conductive drying process are treated.
- 522 Solar drying:**
This subclass is indented under subclass 282. Process wherein energy from the sun is the primary source of energy to conduct the drying process.
- 523 APPARATUS:**
This subclass is indented under the class definition. Device.
- 524 With automatic control:**
This subclass is indented under subclass 523. Apparatus combined with means to sense a condition or change of condition and cause a control operation, including timing means which is other than the drive means for the machine.
- (1) Note. The “condition” sensed may be any condition or property of the material undergoing treatment, of the treating medium, or of the operation of the apparatus.
- (2) Note. Unless otherwise clearly indicated by title and definition, classification is on the basis of the condition controlled, and not the means employed or the condition sensed, for example, humidistatic means to control a heater is in subclass 557.
- (3) Note. For mere periodic sequential or other operation of the machine due to its drive mechanism or to manual intervention, see appropriate apparatus subclasses of this class, such as 87, 143+, and 191.
- (4) Note. Apparatus disclosed for all subject matter elsewhere classified in this class is appropriately cross-referenced except to subclasses 467+, which must be searched for complete search on treatment of gas or vapor.
- SEE OR SEARCH CLASS:
- 73, Measuring and Testing, subclasses 335+ for hygrometers and hygrometers.
- 165, Heat Exchange, subclasses 200+ for an automatically controlled heat exchanger.
- 236, Automatic Temperature and Humidity Regulation, for temperature and humidity responsive means and systems.
- 237, Heating Systems, subclasses 2+ for an automatically controlled heating system.
- 337, Electricity: Electrothermally or Thermally Actuated Switches, subclasses 98+ for a thermostatic switch.
- 374, Thermal Measuring and Testing, subclasses 100+ for a thermometer.
- 525 By web breaking:**
This subclass is indented under subclass 524. Apparatus having means responsive to severing a piece of material of indeterminate length.
- 526 Of plural operations:**
This subclass is indented under subclass 524. Apparatus in which two or more conditions or operations are controlled.
- (1) Note. The only exceptions are subclass 572, which has starting or stopping, and subclass 573, which has feeding or discharging.
- (2) Note. The patents in this subclass and the indented subclasses are cross-referenced to the appropriate subclass for single operations, except subject matter in sub-

classes 535+ is not cross-referenced into subclasses 538+, 557, and 548.

527 Of specific operational sequence:

This subclass is indented under subclass 526. Apparatus having means for causing a plurality of the same or different operations on the material to occur in proper order.

- (1) Note. For example, the operations may be measuring the material, feeding to the dryer or contact apparatus, applying the drying medium, discharging and cooling.

528 Using specific moisture sensor structure:

This subclass is indented under subclass 527. Apparatus having the components of the means to determine the amount of liquid remaining in the material.

529 With photoelectric device:

This subclass is indented under subclass 527. Apparatus combined with a means to provide a light and a means to sense the amount of light.

530 With vacuum sensor:

This subclass is indented under subclass 527. Apparatus combined with a means to sense a reduced pressure in the treating apparatus.

531 With threshold circuit device:

This subclass is indented under subclass 527. Apparatus combined with a component in a control circuit which becomes conductive only with the application of a certain minimum of electromotive force.

532 Gaseous tube (e.g., neon):

This subclass is indented under subclass 531. Apparatus wherein the conductive element is a tube filled with a conducting gas.

533 Silicon-controlled rectifier (SCR):

This subclass is indented under subclass 531. Apparatus wherein the conductive device is a silicon-controlled rectifier.

534 With door switch:

This subclass is indented under subclass 527. Apparatus having an element that makes or breaks a control circuit that is mounted on the door of the apparatus.

535 Having two of heater, contacting gas humidity, or gas mixing:

This subclass is indented under subclass 526. Apparatus in which at least two of, (a) the heating means, (b) humidity of the gas that contacts the material, or (c) mixing of at least two gases are controlled.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 548, for automatic control of air mixing only, even though the alleged result is temperature or contact gas humidity control.
549+ and 556, for control of heater only.
557, for control of contacting gas humidity.

536 With weight measuring means:

This subclass is indented under subclass 535. Apparatus wherein a means is provided to determine the heaviness of the object being acted upon.

537 Having wet bulb and dry bulb thermometers:

This subclass is indented under subclass 535. Apparatus wherein wet bulb and dry bulb thermometers are used to determine relative humidity or dew point.

538 With means to produce reduced or negative pressure:

This subclass is indented under subclass 535. Apparatus wherein a means is provided to lessen the pressure or create a vacuum around an object being treated.

539 With fuel burner:

This subclass is indented under subclass 535. Apparatus wherein the heater has a means to combust fuel.

540 Having plural compartments:

This subclass is indented under subclass 535. Apparatus wherein multiple enclosures for treating an object are provided.

541 With delivery nozzle for contacting gas or vapor:

This subclass is indented under subclass 535. Apparatus wherein an outlet for a discharge of the contacting gas or vapor is provided.

542 With means to increase humidity of contacting gas or vapor:

This subclass is indented under subclass 535. Apparatus wherein a means to increase the water vapor content of the contacting gas or vapor is provided.

543 With heater:

This subclass is indented under subclass 526. Apparatus wherein one of the operations controlled is the means to apply heat.

544 And fire control means:

This subclass is indented under subclass 543. Apparatus having a means to suppress or extinguish a fire in the apparatus.

545 And conveyor:

This subclass is indented under subclass 543. Apparatus wherein one of the operations controlled is the means to transport the material being treated.

546 And blower:

This subclass is indented under subclass 543. Apparatus wherein one of the operations being controlled is the means to propel the gas or vapor doing the treating.

547 And drive motor:

This subclass is indented under subclass 543. Apparatus wherein one of the operations being controlled is the power means for the operation of the machine.

548 Of gas mixing:

This subclass is indented under subclass 524. Apparatus in which the mixing of two or more gases (with or without their contained vapors) is controlled.

549 Of heater:

This subclass is indented under subclass 524. Apparatus in which the action of the heating means is controlled.

(1) Note. Control of the pressure or flow of steam when used as an individual heating medium is treated as heater control.

(2) Note. Automatic heater cut-offs and starters are here.

(3) Note. Since a temperature change of a gas without changing the moisture content results in a change in the relative humidity, control of heating by humidostatic means is placed in this subclass (and not subclass 557) even though a change in humidity is the claimed result.

SEE OR SEARCH THIS CLASS, SUBCLASS:

119, and the notes thereto.

SEE OR SEARCH CLASS:

237, Heating Systems, subclasses 9 and 10 for automatic control of a steam heating system.

432, Heating, subclass 49 for the automatic control of heat generation or transmission in a material heating apparatus not specialized to drying or having a specific heat generator.

550 Sensor engages material:

This subclass is indented under subclass 549. Apparatus including a means that touches the substance being dried.

551 Having burner control:

This subclass is indented under subclass 549. Apparatus wherein the fuel combustor is regulated.

552 By steam pressure or temperature:

This subclass is indented under subclass 549. Apparatus wherein the heater is controlled by varying the force of heated water vapor or its temperature.

553 Electric heater:

This subclass is indented under subclass 549. Apparatus wherein the heating is performed by an electric resistance element.

554 Of heater blower:

This subclass is indented under subclass 549. Apparatus wherein a means is provided to regulate a fan.

555 With means to remove excess heat:

This subclass is indented under subclass 549. Apparatus wherein a means is provided to eliminate an overabundance of heat.

556 By web or strand tension or breaking:

This subclass is indented under subclass 549. Apparatus in which means responsive to degree of web or strand stretching or separation causes a heating control operation.

SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, subclasses 10+ for a material-advancing device that is responsive to the tension of a web or strand.

557 Of contacting gas humidity:

This subclass is indented under subclass 524. Apparatus in which the moisture content or relative humidity of the gas or vapor that contacts the material being treated is controlled.

- (1) Note. Humidostatic control of heaters for the treating gas or vapor is in subclasses 549+ and 556, even though a change in humidity is the claimed result.

SEE OR SEARCH THIS CLASS, SUBCLASS:

467+, and appropriate indented subclasses, for other treatment of treating gas or vapor that is not automatically controlled.
548, for mixing two gas streams even though a change in humidity is the claimed result.

558 Of gas or vapor pressure in treating enclosure:

This subclass is indented under subclass 524. Apparatus in which the force of the gas or vapor within the treating chambers is controlled.

- (1) Note. This subclass includes blow-out panels or valves opened by pressure, including pressure caused by fires or explosions.

SEE OR SEARCH CLASS:

137, Fluid Handling, subclasses 494+, particularly subclasses 505+ for the fluid-pressure regulator subcombination.

559 Subatmospheric pressure:

This subclass is indented under subclass 558. Apparatus wherein the pressure in the enclosure is below atmospheric or under a vacuum.

560 Of rate of treated material motion:

This subclass is indented under subclass 524. Apparatus in which the velocity of the material during drying or gas or vapor contact is controlled.

SEE OR SEARCH CLASS:

432, Heating, subclass 45 for automatic control of or by means sensing or controlling work movement in heating apparatus not specialized to drying, or having specific heat generating structure.

561 Web or strand:

This subclass is indented under subclass 560. Apparatus wherein the material being treated is of indeterminate length.

562 Of time period:

This subclass is indented under subclass 524. Apparatus wherein a means is provided which regulates the time interval of a treating or machine operation.

- (1) Note. Where there is no timing means other than the drive means for the apparatus, see the appropriate type of apparatus.

SEE OR SEARCH THIS CLASS, SUBCLASS:

191, for reverse or pulsating treating gas or vapor flow which maybe caused periodically by machine connections.

SEE OR SEARCH CLASS:

432, Heating, subclass 51 for the control of nondrying heating apparatus by timing, programming, or cycling control means, or of a drying means having a specific combustion heat generator.

563 By timing motor and cam:

This subclass is indented under subclass 562. Apparatus wherein the interval is controlled by an electrical motor and an eccentric.

- 564 By plural timers:**
This subclass is indented under subclass 563. Apparatus wherein more than one timer is used.
- 565 Of flow of gas or vapor treating fluid:**
This subclass is indented under subclass 524. Apparatus wherein the movement of the material treating gas or vapor is controlled.
- (1) Note. Flow control includes starting flow, stopping flow, regulating rate of flow, or any other control of flow.
- (2) Note. Complete the search in this class (34), subclass 562, for timing of flow, including timed reversal of flow, and subclasses 535+ and 548 for gas mixing.
- SEE OR SEARCH CLASS:
432, Heating, subclass 48 for nondrying heating apparatus or apparatus having a specific heat generator with automatic means controlling the cooling, dilution, withdrawal, by-pass, or circulation of work chamber atmosphere.
- 566 With diverter means to alternate flow paths:**
This subclass is indented under subclass 565. Apparatus wherein a means is provided that redirects treating gas or vapor from one flow path to another.
- 567 Exhaust controlled by solvent concentration:**
This subclass is indented under subclass 565. Apparatus wherein the removal of exiting treating gas or vapor is controlled by the amount of a solvent contained in the treating gas or vapor.
- 568 Steam pressure controlled:**
This subclass is indented under subclass 565. Apparatus wherein the force per unit area of heated vapor which treats the material is regulated.
- 569 Of circulation means:**
This subclass is indented under subclass 565. Apparatus having means to regulate the means of moving the gas or vapor.
- 570 With flow control valve:**
This subclass is indented under subclass 565. Apparatus wherein the flow of gas or vapor treating fluid is regulated by a device which opens or closes.
- 571 With flow control dampers at outlet:**
This subclass is indented under subclass 565. Apparatus wherein adjustable plates modify the flow of gas or vapor treating fluid at an orifice inside the treating chamber.
- 572 Of starting or stopping:**
This subclass is indented under subclass 524. Apparatus having means to (a) begin the operation of the machine, (b) finish operation of the machine, or (c) both.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
526+, for the above combined with other automatic control operations.
- 573 Of treated material feeding or discharging:**
This subclass is indented under subclass 524. Apparatus having means to (a) control feeding of material undergoing treatment, (b) control discharge of such material, or (c) both.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
526+, for the above combined with other automatic control operations.
- SEE OR SEARCH CLASS:
221, Article Dispensing, subclasses 9+ for an article dispensing (feeding) device, per se, not otherwise provided for, including automatic control.
222, Dispensing, subclasses 5+ for automatic control of dispensing feeder.
- 574 Controlled by weight:**
This subclass is indented under subclass 573. Subject matter wherein the means for feeding or discharging is powered after an accumulation of a certain mass of the material being treated.

575 Controlled by temperature:

This subclass is indented under subclass 573. Subject matter wherein the means for feeding or discharging is powered depending on the temperature of the material.

576 With fluid current conveying of treated material:

This subclass is indented under subclass 523. Subject matter wherein the treated material is moved by a fluid flow from one part of the apparatus to another, the arrangement being such that the material would not be so transported in the absence of the fluid flow.

- (1) Note. Since this subclass usually of necessity includes drying plus material separation, it includes all fluid current type dryers, including plural operations on the material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 359+, for the process of fluid current conveying.
376, for a device that recirculates material.
640+, for a device supporting or guiding a web, cord, or strand by a gas or vapor.

SEE OR SEARCH CLASS:

- 99, Foods and Beverages: Apparatus, subclasses 467+ and 516+ for an enclosed modified atmosphere and fluid application apparatus respectively, including fluid moving means.
159, Concentrating Evaporators, subclasses 3, 4.1+, and 16.1+ for a similar device relating to a concentrating evaporator.
266, Metallurgical Apparatus, subclass 251 for ore treating apparatus having a heated zone within which pulverulent material is suspended within a flowing fluid.
406, Conveyors: Fluid Current, and see the search notes under the main definition for other fluid current conveyors.
426, Food or Edible Material: Processes, Compositions, and Products, subclass 94 for process of coating foods involving suspension of particulate material in a gaseous medium.

- 432, Heating, subclass 58 for residual heating apparatus in which heating gas conveys, agitates, scatters, or disintegrates the work.

577 Downward fluid flow impinging solid floor:

This subclass is indented under subclass 576. wherein a fluidizing current is in a downward direction where it impacts a hard surface and reflects up through the material.

578 Having tubular heat exchanger:

This subclass is indented under subclass 576. Subject matter wherein the fluidly conveyed material contacts a pipe filled with a heat transfer material.

579 With means to vary gas or vapor flow:

This subclass is indented under subclass 576. Subject matter having a means to control the gas or vapor current, such as a valve.

580 With additional conveying means:

This subclass is indented under subclass 576. Subject matter having an extra transporting means besides the fluid current conveying means.

581 Suction conveyor:

This subclass is indented under subclass 580. Subject matter wherein the additional conveying means uses a vacuum.

582 With specific gas distributor:

This subclass is indented under subclass 576. Subject matter that has a gas delivery means having special details.

583 Having angled floor or wall:

This subclass is indented under subclass 582. Subject matter wherein the gas or vapor distributor comprises a floor or wall that is inclined from the horizontal or the vertical.

584 Having thermal expansion adjustment:

This subclass is indented under subclass 582. Subject matter provided with a means to correct for an enlarging of the distributor caused by heat.

585 Gas or vapor delivery nozzle:

This subclass is indented under subclass 582. Subject matter wherein the gas distributor is a projecting opening.

- 586 With means to agitate or comminute material:**
This subclass is indented under subclass 576. Subject matter combined with a means to mix or grind the treated material.
- 587 Gas or vapor presses material against screen or sieve:**
This subclass is indented under subclass 576. Subject matter wherein the conveying gas or vapor pushes the treated materials against a rigid mesh.
- 588 With baffle or deflector to adjust material flow:**
This subclass is indented under subclass 576. Subject matter wherein the flow of the treated material is controlled by a variable or fixed obstruction in the path of the material.
- 589 With plural treating zones or compartments:**
This subclass is indented under subclass 576. Subject matter wherein the conveyed material flows through more than one treating area or chamber.
- 590 Serpentine path for material:**
This subclass is indented under subclass 589. Subject matter wherein the flow path through the plural treating zones is S-shaped.
- 591 With material separator:**
This subclass is indented under subclass 576. Subject matter having a means to remove the treated material from the conveying fluid.
- 592 Plural cyclone separators:**
This subclass is indented under subclass 591. Subject matter wherein the treated material is removed from the conveying fluid by more than one centrifugal separator.
- 593 With mechanical rotating element:**
This subclass is indented under subclass 576. Subject matter wherein the treated material is suspended in a fluid by a physically revolving component.
- 594 Using rotary gas current:**
This subclass is indented under subclass 576. Subject matter wherein the treated material is suspended by a revolving fluid flow.
- 595 With drum or receptacle enclosing housing:**
This subclass is indented under subclass 132. Subject matter in which the drum or receptacle is totally or partially contained in a surrounding enclosure.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
139, for such a housing without heating means.
- 596 Combined washer-dryer:**
This subclass is indented under subclass 595. Subject matter in which the device can be used to both clean and dry the material.
- 597 With material conditioner dispenser:**
This subclass is indented under subclass 595. Subject matter combined with a distributor to supply an additive to improve the treated material.
- 598 And heat retaining material:**
This subclass is indented under subclass 595. Subject matter including a substance that holds heat for later use.
- 599 And material tumbling assisting means:**
This subclass is indented under subclass 595. Subject matter including ribs, vanes, etc. in the drum to lift or agitate the material being treated.
- 600 And stationary trays in rotatable drum:**
This subclass is indented under subclass 595. Subject matter including nonmoving supports inside the drum for the treated material.
- 601 And supporting, driving, sealing, or bearing means for drum:**
This subclass is indented under subclass 595. Subject matter including means to bear the weight of the drum; means to power the drum for movement; means to close the drum off from other parts of the device; or journal means to support the drum for rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
242, for seals for use in dryers in general.

- SEE OR SEARCH CLASS:
 248, Supports, for support of general utility.
 277, Seal for a Joint or Juncture, for a generic sealing means or process, cross-reference art collection 903 for seal for a rotating kiln or drum.
 384, Bearings, for bearings of general utility.
- 602 Specific drum structure:**
 This subclass is indented under subclass 595. Subject matter relating to explicit details of the drum.
- 603 Specific housing structure:**
 This subclass is indented under subclass 595. Subject matter relating to explicit details of the housing.
- 604 Including gas or vapor circulating means:**
 This subclass is indented under subclass 595. Subject matter including means to move the gas or vapor through the drum or housing.
- 605 Suction means:**
 This subclass is indented under subclass 604. Subject matter wherein the means to move the gas or vapor is a means to create a negative or reduced pressure.
- 606 And gas or vapor flow regulating means:**
 This subclass is indented under subclass 604. Subject matter also including a means to control or direct the gas or vapor flow such as a valve, shutter, damper, diverter, etc.
- 607 And conduit to deliver gas or vapor to drum:**
 This subclass is indented under subclass 604. Subject matter also including a duct or pipe that conveys the gas or vapor directly to the drum.
- 608 Vertical gas or vapor flow:**
 This subclass is indented under subclass 604. Subject matter also including a circulation of the gas or vapor from top to bottom or bottom to top.
- 609 Axial gas or vapor flow:**
 This subclass is indented under subclass 604. Subject matter wherein a circulation of the gas or vapor is in the line about which the drum rotates.
- 610 Radial gas or vapor flow:**
 This subclass is indented under subclass 604. Subject matter wherein a circulation of the gas or vapor is in a direction from the axis of rotation to the walls of the drum, like the spoke of a wheel.
- 611 Sheet, web, or strand:**
 This subclass is indented under subclass 523. Subject matter for the treatment and handling of articles such as a broad, thin piece of material; a woven textile fabric; or a continuous fiber or filament such as a cable, rope, thread, or yarn.
- (1) Note. This subclass and the following subclasses include means such as racks for holding planar articles such as lumber in spaced relation but the mere separation of such article in stacks that are treated in an enclosure is excluded, being found in subclasses 201+.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 103 and 104+, for a sheet, web, or strand that constitutes a hollow article and is treated and handled as a hollow article.
 201+, for a house, kiln, and container, including a conveyor, disclosed for handling a sheet, web, or strand but adapted to handle other material, particularly subclass 205 for superposed roller-type conveyors disclosed for handling veneer or a board.
- 612 Sheet elevator type:**
 This subclass is indented under subclass 611. Subject matter including a mechanism to raise or lower a sheet or other planar sheetlike material and having means peculiar to the handling of a sheet individually.
- (1) Note. The sheet handling means may be in the form of a sheet gripper, flier, sheet, or can lid edge engaging screw, etc.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 147, for means moving material, including sheetlike material, in a spiral path.
 189 and 190, for similar apparatus even though disclosed for handling a sheet but having no means for individually handling the sheet.
- SEE OR SEARCH CLASS:
 198, Conveyors: Power-Driven, for a conveyor, or plural conveyors, having a platform, gripper, or opposed surfaces that move vertically and thus provide means suitable for raising or lowering sheet material, including subclasses 346.1+, 463.1+, 604+, 625, 626.1+, 663, and 793+.
- 613 Coacting parallel threaded members:**
 This subclass is indented under subclass 612. Subject matter wherein the elevator mechanism is made up of two nondiverging, screwlike members wherein the material is positioned between the two members and in the threads such that the material is elevated by turning the screws.
- 614 Sheet on edge:**
 This subclass is indented under subclass 611. Subject matter for handling and treatment of planar pieces resting on their thin sides.
- (1) Note. The patents herein in the main include a rack or conveyor holding sheet material on edge.
- 615 Stationary support:**
 This subclass is indented under subclass 614. Subject matter including a nonmoving means on which the material rests.
- 616 Rotary wheellike conveyor:**
 This subclass is indented under subclass 614. Subject matter wherein the means to hold a sheet or edge is a revolving disk or ring with spokes that support the material.
- 617 Endless conveyor with fingers:**
 This subclass is indented under subclass 614. Subject matter wherein the means to hold a sheet or edge is a closed band travelling in an endless path having upstanding appendages.
- 618 For flexible sheet, web, or strand:**
 This subclass is indented under subclass 611. Subject matter including means to treat a pliable sheet, web, or strand such as textile, paper, cord, or filament.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 184+, for a rotary rack not limited to sheet, web, or strand.
 239, for a plate on which sheetlike material is placed.
 240, for a supporting rod.
- SEE OR SEARCH CLASS:
 26, Textiles: Cloth Finishing, subclasses 81, 92, or 106 for drying or heating textiles combined with positive stretching means.
 69, Leather Manufactures, subclass 19.
 211, Supports: Racks, appropriate subclasses.
 242, Winding, Tensioning, or Guiding, subclass 127.
 254, Implements or Apparatus for Applying Pushing or Pulling Force, subclasses 199+ for a similar device not including any positive drying means.
 432, Heating, subclass 59 for a residual heater flexing, looping, or coiling a sheet, web, or strand.
- 619 Including horizontal support:**
 This subclass is indented under subclass 618. Subject matter including a level platform.
- 620 Including roller-type conveyor:**
 This subclass is indented under subclass 618. Subject matter including rotating cylinders that move the material.
- 621 Including means to suspend work:**
 This subclass is indented under subclass 618. Subject matter including a means to let the material hang free.
- 622 Portable or collapsible:**
 This subclass is indented under subclass 621. Subject matter wherein the treating device can be moved from place to place or folded compactly.

623 Running length:

This subclass is indented under subclass 618. Subject matter wherein the web or strand is a moving continuous length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

110+, for an external rotary drum where the sheet, web, or strand is passed over the external surface of a drum.

SEE OR SEARCH CLASS:

38, Textiles: Ironing or Smoothing, for pertinent subclass(es) as determined by schedule review.

68, Textiles: Fluid Treating Apparatus, particularly subclasses 157+.

226, Advancing Material of Indeterminate Length, for feeding material without utilizing the leading or trailing ends to effect movement of the material.

624 With contact heater:

This subclass is indented under subclass 623. Subject matter wherein the material moves across a surface that has a means to increase its temperature.

625 Winding reel:

This subclass is indented under subclass 623. Subject matter in which the material is wrapped up on a rotating member.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

94, for devices interwinding a spacing sheet and a sheet to be dried.

110+, for rotary drums of the external drum type.

629, 647, and 657, for treating material travelling a tortuous path.

SEE OR SEARCH CLASS:

43, Fishing, Trapping, and Vermin Destroying, subclasses 20 and 21 for a fishing rod reel.

242, Winding, Tensioning, or Guiding, particularly subclasses 370+ for a reel having no added means as a heater or gas or vapor contact producing means to cause drying.

626 With fluent heating means inside reel:

This subclass is indented under subclass 625. Subject matter wherein the reel has a means to circulate a heating fluid in its interior.

627 Plural webs or strands:

This subclass is indented under subclass 623. Subject matter including means to handle and treat more than one web or strand.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

144, for feeding sheetlike material between plural press couples.

628 With means to separate individual webs or strands:

This subclass is indented under subclass 627. Subject matter including means to partition multiple webs or strands into single webs or strands.

629 With gas or vapor circulation for contact with treated material:

This subclass is indented under subclass 623. Subject matter including means to impinge the treated material with a gas or vapor or to distribute a gas or vapor.

630 Having solvent chamber:

This subclass is indented under subclass 629. Subject matter including a compartment that contains a gas or vapor solution that is capable of dissolving an impurity on the material.

631 Having means to adjust relative distance between distributor and material:

This subclass is indented under subclass 629. Subject matter including means to vary the interval between the material and a means to deliver a gas or vapor to the material.

632 Having means to produce turbulence in gas or vapor:

This subclass is indented under subclass 629. Subject matter including a means to generate a nonlaminar flow of a gas or vapor.

633 Having baffle redirect gas or vapor flow:

This subclass is indented under subclass 629. Subject matter including a partition or shutter to provide alternative flow paths for gas or vapor.

634 Having sealing means:

This subclass is indented under subclass 629. Subject matter including means to prevent the escape of gas or vapor from a treating chamber.

635 Including suction means:

This subclass is indented under subclass 629. Subject matter including a vacuum pump or means to create a reduced pressure.

636 Including plural chambers or zones:

This subclass is indented under subclass 629. Subject matter including more than one treating compartment or treating area.

637 Having drive roller:

This subclass is indented under subclass 629. Subject matter including a power cylinder to propel the web or strand through a treating area.

638 Including gas or vapor nozzle or distributor outlet:

This subclass is indented under subclass 629. Subject matter including a projecting discharge opening or an aperture which dispenses a gas or vapor.

639 Having gas or vapor flow transverse to treated material movement:

This subclass is indented under subclass 629. Subject matter including a gas or vapor flow which is perpendicular to the direction in which the material is moving.

640 Fluid current support or guide:

This subclass is indented under subclass 629. Subject matter including means to direct or suspend the running length by means of a fluid blast or flow.

SEE OR SEARCH THIS CLASS, SUBCLASS:

117 and 120, for means for threading, stripping, or guiding a web in conjunction with drum dryers including fluid current guiding means.

576+, for similar apparatus for treating other material, and subclasses 359+ for a similar process.

SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector and reel driving or reel stopping means, etc.), subclasses 97.1+ for fluid current means to advance the material.

242, Winding, Tensioning, or Guiding, for more than a nominal supply or take-up coil structure (e.g., a support for such a coil, a cooperative relationship between a tension or exhaust detector and reel driving or reel stopping means, etc.), subclasses 615.11+ a residual locus for a material fluid suspension guide or guard.

641 Having airfoil or Coanda nozzle:

This subclass is indented under subclass 640. Subject matter including a surface that controls the gas or vapor flow or a nozzle that establishes a laminar flow along a surface that remains locked along the surface means unless disturbed.

642 Having nozzles around circular manifold:

This subclass is indented under subclass 640. Subject matter including gas or vapor flow distributors positioned on the circumference of a drum.

643 Having nozzles on opposite sides of web:

This subclass is indented under subclass 640. Subject matter including gas or vapor distributors situated to face each other and different sides of the web.

644 Adjustable distance between opposed nozzles:

This subclass is indented under subclass 643. Subject matter including means to vary the spacing between facing nozzles.

645 Suspended loops:

This subclass is indented under subclass 629. Subject matter in which the material is supported in hanging loops over rods.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 647, for means to guide material in a zig-zag path in which the material is positively guided at each bend.
- SEE OR SEARCH CLASS:
 198, Conveyors: Power-Driven, subclass 681 for a conveyor having load-suspending members extending between parallel drive means such as endless belts.
 226, Advancing Material of Indeterminate Length, especially subclasses 104+ for a festooning device, per se.
- 646 Edge holding means:**
 This subclass is indented under subclass 629. Subject matter including means to grasp the material by its edges as by gripping or impaling.
- SEE OR SEARCH CLASS:
 26, Textiles: Cloth Finishing, subclasses 52+ and 92 for fabric stretching combined with drying or heating. The line is: Class 26 takes fabric stretching combined with drying or heating when special means or steps are provided in addition to the stretching caused by the feed of the material through the machine.
 198, Conveyors: Power-Driven, subclasses 468.01+ and 469.1+ for a conveyor having load gripping members, and subclasses 692+ for a conveyor having a load impaler.
- 647 Zigzag runs of treated material:**
 This subclass is indented under subclass 629. Subject matter including means to guide the running length in a tortuous path having a guiding means at each bend.
- SEE OR SEARCH CLASS:
 68, Textiles: Fluid Treating Apparatus, particularly subclasses 158, 159, and 160.
 226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector and reel driving or reel stopping means, etc.), subclasses 118.1+ for plural material moving means having intermediate storage.
- 648 Including material tension adjusting means:**
 This subclass is indented under subclass 647. Subject matter including means to vary the amount of stretch applied to the material.
- 649 Including gas or vapor recirculation:**
 This subclass is indented under subclass 647. Subject matter including means to capture and reuse some of the treating gas or vapor.
- 650 Including endless conveyors:**
 This subclass is indented under subclass 647. Subject matter wherein the zigzag pattern for the running length is composed of a series of closed bands travelling in a boundless path.
- 651 Plural zones or chambers:**
 This subclass is indented under subclass 647. Subject matter wherein the material passes through more than one treating area or compartment.
- 652 Elongated thin gas or vapor stream:**
 This subclass is indented under subclass 629. Subject matter including means to direct a blast of gas upon, or draw gas over the material in a relatively fine slender stream.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
 640+, for apparatus where the blast guides or floats the web.
- SEE OR SEARCH CLASS:
 15, Brushing, Scrubbing, and General Cleaning, subclass 300.1 and particularly 303+, 316.1, and 405+, for blast or suction removal of foreign material such as water from a work piece, and see the reference to Class 15 in (3) Note in the main class definition of this class for a statement of the line.
- 653 Including distributor comprising tube with elongated slot:**
 This subclass is indented under subclass 652. Subject matter including a cylinder having a long thin slit as an exit for the gas or vapor.

- 654 Including distributor comprising perforated plate:**
This subclass is indented under subclass 652. Subject matter wherein the means to create the elongated gas or vapor stream is a sheet having multiple apertures.
- 655 Including distributor having elongated slot:**
This subclass is indented under subclass 652. Subject matter wherein the means to create the elongated gas or vapor stream is a long thin slit.
- 656 Plural associated elongated slots:**
This subclass is indented under subclass 655. Subject matter wherein the means to create the elongated gas or vapor stream are plural long thin slits that coact to produce one stream.
- 657 Zigzag runs of treated material:**
This subclass is indented under subclass 623. Subject matter including means to guide the running length in a tortuous path having a guiding means at each bend.
- SEE OR SEARCH CLASS:
226, Advancing Material of Indeterminate Length, may include a nominal recitation of a supply or take-up coil (e.g., less than a support for such a coil or a cooperative relationship between a tension or exhaust detector and reel driving or reel stopping means, etc.), subclasses 118.1+ for plural material moving means having intermediate storage.
- 658 Endless conveyor or movable gripper:**
This subclass is indented under subclass 618. Subject matter including either (a) a boundless transport means for the sheet, web, or strand material, or (b) means to grasp the material where such means are mounted for motion and driven by the device, or both.
- SEE OR SEARCH CLASS:
198, Conveyors: Power-Driven, subclasses 468.01+ and 469.1+ for a conveyor having load gripping members, and subclasses 804+ for an endless belt conveyor.
- 659 Endless conveyor:**
This subclass is indented under subclass 658. Subject matter having a boundless transport means for the material.
- 660 Endless conveyor having material gripper:**
This subclass is indented under subclass 659. Subject matter including a boundless conveyor with means to grasp the material.
- 661 Endless conveyor having material hanger:**
This subclass is indented under subclass 659. Subject matter having a means to suspend the material connected to the boundless transport means.
- 662 Plural opposed cooperating endless conveyors:**
This subclass is indented under subclass 659. Subject matter wherein two boundless conveyors have coacting faces between which the material is moved.
- 663 Endless conveyor contacts solid perforated guide:**
This subclass is indented under subclass 659. Subject matter wherein the face of a boundless conveyor moves across a rigid apertured plate so the material is moved between the guide and conveyor.
- 664 Movable treated material holder:**
This subclass is indented under subclass 618. Subject matter including holding means for the sheet, web, or strand that are mounted for motion.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
184, for rotary carriers or racks, and 192+, for shelf- or tray-type dryer not restricted to sheets, webs, or strands.
658+, for endless conveyors or movable grippers.
- SEE OR SEARCH CLASS:
26, Textiles: Cloth Finishing, subclasses 81, 92, or 106, and see the reference to this class (34) in the definition of subclass 646.
69, Leather Manufactures, subclass 19 for boards on which hides, skins, or leather is "put out" for drying.

- 665 Rotary holder:**
This subclass is indented under subclass 664.
Subject matter wherein the material holder is mounted to revolve.
- 666 Car dryer:**
This subclass is indented under subclass 201.
Apparatus wherein the enclosure is adapted for drying an automobile.
- 667 Debris guard:**
This subclass is indented under subclass 523.
Apparatus having a means to shield against waste entering the treating chamber.

END